

Probably no one process has ever exerted so beneficial an influence over all the branches of dentistry, as the work with porcelain is doing to-day. While the profession as a whole has not yet become acquainted with it, the more progressive men are fast realizing the desirable possibilities of porcelain and the improved facilities for its use, and they are rapidly taking it up and acquiring skill in its manipulation.

The necessity for taking infinite pains which porcelain requires of an operator, in order that he may succeed in its various uses, soon becomes a habit, which he carries into his other work, where he may have been less careful before. His renewed interest in his work is noticed by other men in the profession, and they are filled with a sense of unrest and a feeling that there is something they are lacking, and ere long they, too, are fascinated with the subject of porcelain and the necessity for care in its manipulation increases interest in their work.

At this time of porcelain enthusiasm, its workers and advocates are not confining their efforts to the simple inlays and the ordinary porcelain crown construction on a post and band of platinum, but are venturing into more extended and complicated uses in restoring lost tooth structure with this best of all materials. Sometimes their efforts are attended with failure and regret, yet often with success, which more than repays them for their disappointments, and convinces them that the principles involved in the proper handling and fusing of porcelain are not so mysterious that they cannot be mastered.

In February, 1903, Dr. C. H. Land showed me what seemed to be at first glance, an extracted central incisor, with the enamel detached from



the dentine in one complete shell, but which, upon second inspection, proved to be a shell of porcelain reproducing the natural enamel. It truly was the prettiest thing I had ever seen in dental porcelain, and Dr. Land refers to the process in his article in the *Dental Cosmos*, Vol. XLV 6 and 8, June and August, 1903. At first, I had no faith in the durability of such a thin shell of porcelain for actual use in the mouth, but the beauty of the thing led me to experiment on extracted teeth, and, after cementing several on the models and finding what severe tests they would withstand, I decided to put them to practical use in the mouth, and since May, 1903,

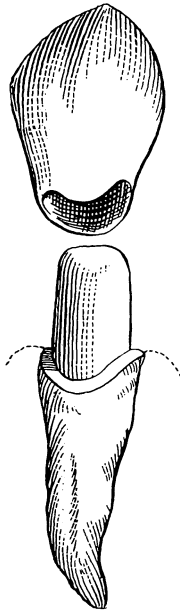


FIG. 1

have used no other method for crowning incisors and cuspids where there remained sufficient dentine; I have also used the method on many molars and bicuspid.

**Technique
of all Porcelain
Crown Work.**

The following process in detail for preparing the tooth, forming matrix, adapting veneer and fusing, I have adopted after considerable experiment and practice, as being the most simple, direct and accurate means of producing a uniformly successful result.

Let us first look at figures 1 and 2, to get a better idea of what it is we wish. Fig. 1 shows a tooth properly prepared, enamel removed to the

shoulder at the gum line and dentine more or less cone shaped. Its shell of porcelain is seen above, and when in place on the tooth fits as nicely as shown in Fig. 2, joint everywhere flush and almost, if not quite as tight as an inlay joint.

When a tooth in the mouth calls for treatment in this manner it is usually because of deficient enamel; consequently there is not the large amount of enamel to remove which would be found on a normal or perfect tooth.

We will imagine an upper central incisor, the enamel of which is lacking on the labial surface from erosion, and we desire to remove the remainder of the enamel, preparatory to making a porcelain jacket.

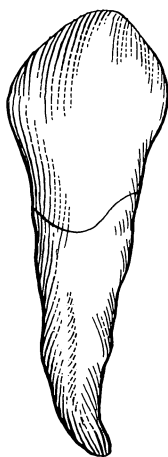


FIG. 2

Method of Removing Enamel.

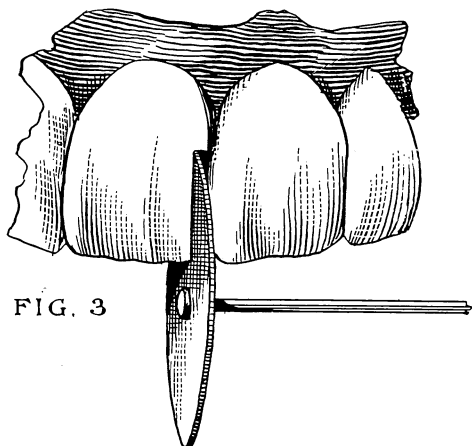


FIG. 3

We first take a $\frac{7}{8}$ -inch, thin, separating carborundum disk (rubber and carborundum), mounted in the engine hand piece and, being revolved at a high speed and kept wet with a stream of warm water from the syringe in the hands of an assistant, the mesio-approximal surface is removed in the manner indicated in Fig. 3. Commence at the cutting edge and move the disk toward the cervix. Where the disk is stopped at the gum, a shoulder is left such as is desired around the entire tooth when the preparation is completed, and this shoulder should be at, or slightly below, the gum line.

The disto-approximal surface is dressed in like manner and the remaining enamel removed from the labial and lingual surfaces by means of a $\frac{1}{2}$ -inch knife-edge carborundum stone (not disk). This removes the enamel

ITEMS OF INTEREST

from four sides and leaves four corners to be rounded off by means of the disk again, approached at different angles.

Up to this point we have paid little attention to the shoulder except as left by the disk on the approximal surfaces. By the use of the smallest inverted cone carborundum stones on the market (3/16 inch, No. 184, Lee, Smith & Sons) mounted with shellac on an old bur, the shoulder on the labial surface is partially dressed, and a similar stone mounted on a right angle hand piece bur, accomplishes the same result on the lingual surface.

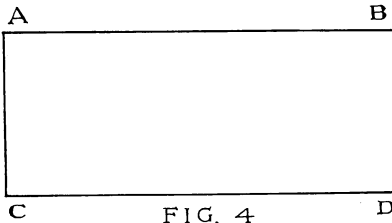


FIG. 4

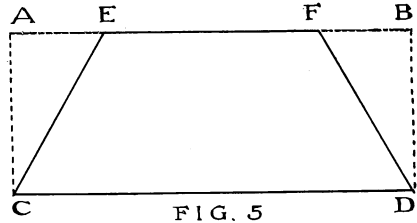


FIG. 5

The shoulder is finished and receives its definite line by means of sharp wheel burs. Let the use of *new, sharp* knife-edge stones and *new, sharp*, wheel burs be emphasized, for a dull bur and a dull stone both cause pain. The point, or cutting edge of the tooth, is shortened and the whole treated with a few quick touches with a sand-paper disk to smooth and complete the preparation of the tooth to receive the matrix. For convenience, we will call the prepared portion of the tooth the conical portion.

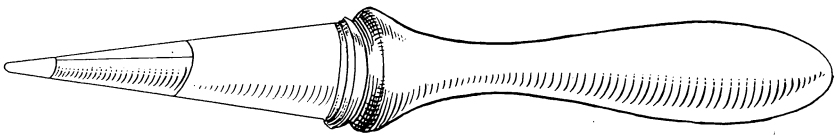


FIG. 6

In preparing a tooth in this manner we have not encroached upon the pulp at all, and what would seem to be an excruciatingly painful operation is really little more annoying than the preparation of cavities, as we do almost every day.

Forming the Matrix.

The first step in forming the matrix is to obtain the circumference of the tooth *over the shoulder and under the gum*. This is done by means of a denterimeter, or by a thin strip of copper or other metal pinched about the tooth. This measurement is more conveniently taken before the tooth is prepared and the shoulder formed.

PROSTHODONTIA

Now cut a piece of inlay platinum ($\frac{1}{1000}$ inch) $\frac{1}{16}$ inch longer than the measurement taken and $\frac{3}{8}$ inch broader than the length of the conical portion of the tooth from the shoulder to the point. This rectangular piece of platinum, as shown in Fig. 4, is now changed by cutting off the angles "A" and "B" to the form C, E, F, D, Fig. 5. The edges C, E, and D, F, are lapped $\frac{1}{32}$ part of an inch, the cone shaped instrument Fig. 6, assisting to bring the edges of the platinum in absolute contact, which is

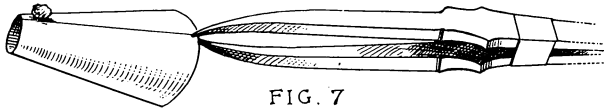


FIG. 7

then firmly held in the pliers (Fig. 7) while the end of the seam is soldered with a very small particle of pure gold. As soon as part of the joint is soldered, loose the pliers and grasp the platinum on the side opposite to the seam, and if the edges are in absolute contact, there is sufficient gold

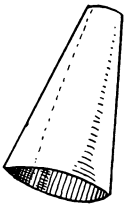


FIG. 8

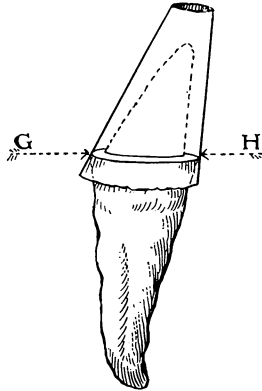


FIG. 9

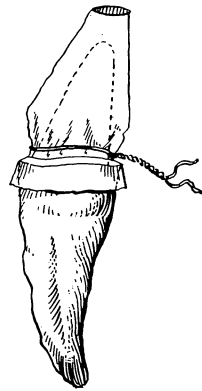


FIG. 10

present to complete the union of the edges when the heat is again applied. The very smallest particle of gold should be used in soldering.

Fig. 8 shows the platinum cone, which is $\frac{1}{32}$ inch larger at its base than the circumference of the tooth, and when placed over the tooth will slip over the shoulder and under the gum.

The advantage of the cone is now shown in Fig. 9, for the farther over the tooth it is carried, the tighter it becomes at the points G and H, where the fit of the matrix *must be exact*.

Now, with a piece of No. 27 gauge copper wire in the dentimeter, a loop is placed about the cone (Fig. 10) and is alternately tightened by twisting, and carried toward the shoulder with a burnishing instrument until the wire has been worked carefully into the angle between the



ITEMS OF INTEREST

shoulder and the conical portion, carrying the platinum with it and shrinking it to the tooth. During this stage of the process, the forefinger of the left hand has been held tightly on the point of the cone to keep it firmly in place. The wire is now tightened as much as possible without breaking it, and serves to hold the platinum firmly while the next stage of the burnishing is done.

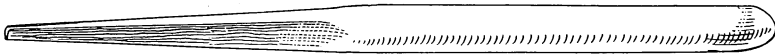


FIG. 11

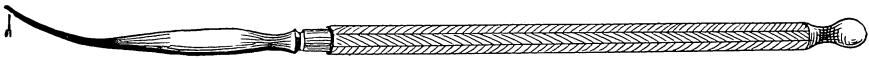


FIG. 11A

The burnishing instrument (Fig. 11) is made from a bone handle of a mouth mirror, and its shape is seen in the illustration. With the thumb and forefinger the platinum is pinched to the conical portion, aided by the burnisher and narrow nosed pliers, or tweezers, so that the surplus is carried to the approximal sides (Fig. 12, I and J). Now trim the surplus,

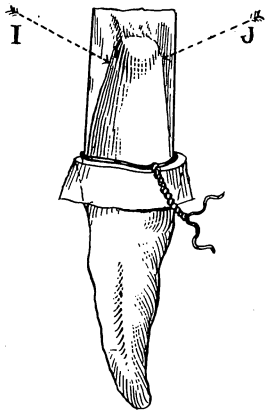


FIG. 12

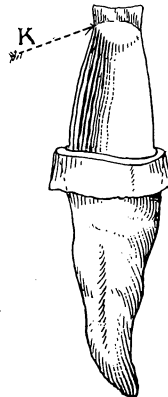


FIG. 13

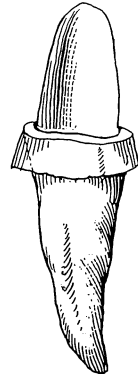


FIG. 14

leaving an extension of about $\frac{1}{32}$ to $\frac{1}{16}$ of an inch, which is lapped over and burnished down smoothly on the sides, but not on the point, as in Fig. 13. The wire is now removed and the platinum thoroughly burnished over the shoulder and into the angle, using besides the bone burnisher, the small "V"-shaped steel burnisher (Fig. 11A). The unburnished point of the matrix (K, Fig. 13), is now grasped in the pliers and the matrix removed and replaced once or twice to make certain that it does not bind at or below

PROSTHODONTIA

the shoulder. This done, the point is lapped and burnished, as were the sides, and the matrix is completed (Fig. 14).

Preparation of the Porcelain Veneer.

The next step is the preparation of the veneer, which forms the labial portion of the jacket.

The proper shade and shape is selected in a vulcanite tooth on account of its shoulder (L, Fig. 15), which assists in adjusting to the matrix. The back

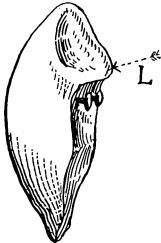


FIG. 15



FIG. 16

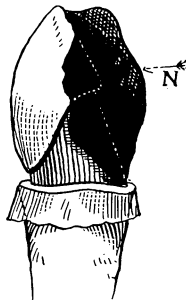


FIG. 18

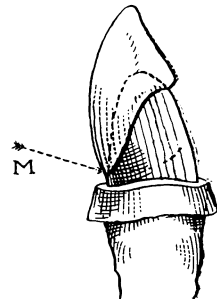


FIG. 17

and pins are ground away until a very thin veneer is left, as in Fig. 16. This grinding is not so laborious a task as might be supposed if small knife-edge carborundum stones are used together with the little inverted cone stones (No. 184) previously mentioned. The stones should be kept thor-



FIG. 20

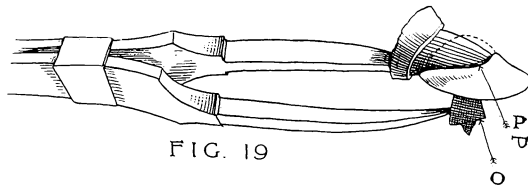


FIG. 19

oughly wet during the grinding, and the veneer tried on the matrix, which is in place on the tooth, from time to time, in order to bring it to proper alignment with the other teeth. When it assumes the desired position, the cervical end of the veneer is shortened, so that it does not touch the shoulder, as at M, Fig. 17. It is now thoroughly washed, to remove all particles of carborundum, and adjusted to position, where it is held with finger of left hand while a small ball of wax (gutta percha base-plate wax preferred) is warmed and pressed against the lingual portion of matrix and veneer, imbedding them so that they are held in their proper relation (Fig. 18).

ITEMS OF INTEREST

Usually the veneer and matrix are held firmly enough by the wax so that they are removed from the tooth together, but if they should separate, the wax and veneer remain together and the matrix is readily teased off the tooth and placed in its position between the wax and veneer.

Having a pair of tweezers, with sliding band for locking them, place a small piece of vulcanite rubber on one beak; insert the bare beak within the matrix and let the one protected with the rubber rest on the outside of veneer; close and lock. Remove the wax, and the matrix and veneer will be found to be held firmly in their relative position, as is shown in Fig. 19.

The gutta percha base-plate wax (N, Fig. 18) is not excessively sticky, and is black, and if any particles remain they are readily seen and removed before applying the porcelain body. O, Fig. 19, shows how the rubber is utilized to prevent beak of pliers from slipping on surface of veneer.

The body is first applied on one side, only at the point indicated by the arrow P, in Fig. 19, and, being mixed rather thin at first, the tweezers are thoroughly jarred by drawing across them a rough handled instrument until the moisture is seen to appear on the opposite side of the matrix, corresponding to where first applied. This shows that all the air between the matrix and veneer has been driven out by the moist body. Now additional body is applied in a much drier state, until the matrix is covered only so far as indicated by the dotted line in Fig. 19. In no case let the body reach the shoulder before the first fusing. The moisture being thoroughly jarred out, the work is ready for the first fusing. Remove the pliers, when the matrix and veneer will be found to be held firmly by the body so that the whole will stand upright, resting on the base of the matrix, and is carried on the slab into the furnace in this manner. At the time of first fusing the moisture should be dried out slowly, for if heated too rapidly the moisture between the matrix and veneer will form steam and throws the veneer off. Let the work be slowly moved into the furnace, so that the veneer faces and receives the heat first.

After fusing, place the united veneer and matrix on the tooth and the portion of the matrix over the shoulder of the tooth is again burnished to correct any possible changes which may have taken place during previous handling. Removed, and again washed, the matrix is completely covered with body flush to the shoulder line and built up and carved on the lingual and approximal surfaces, as the case may require. There may be as many fusings as the operator deems necessary to produce the desired result. How nearly the finished article resembles the shape and shade of a natural tooth must depend upon the operator's knowledge of tooth anatomy, his artistic eye and his ability to manipulate porcelain.

PROSTHODONTIA

Fig. 20 shows shell complete before matrix is removed. The matrix is removed much as it is from an inlay, by pulling away from the sides with a pair of tweezers, care being used not to let them slip and strike the edge of the shell to chip it. If the matrix clings very closely up in the point, it is readily detached with a small bur in the engine. (See Figs. 1 and 2 for shell complete, with matrix removed.)

Setting. Before setting in place with cement, the inside of shell is etched with hydrofluoric acid, to provide a surface for the attachment of the cement. The dentine of the tooth should be varnished with a good cavity lining before cementation. The cement should not be mixed too thin, neither should it be so thick that much force is necessary to carry shell to place, as it might be fractured in this way.

A question which will readily suggest itself is, does not the grinding out of the porcelain tooth to form so thin a veneer change its color, and also, will not the cement change its shade when set in place? That is answered by saying that the portion of the porcelain tooth ground away is usually yellow, of a varying shade and the characteristic blue, brown or other shade is retained in the veneer, and when a cement is chosen, a yellow is selected, which will replace the underlying yellow, ground away. It is possible to influence the shade of the shell somewhat in the choice of a cement.

By the completed and cemented shell we have a live and healthy tooth, thoroughly protected from injurious external influences. Experience teaches us that a tooth is never so comfortable with a metal filling or metal crown as it is with a porcelain inlay or porcelain shell. It is more artistic and natural than any other style of crown. No other crown has so flush and tight a joint, and the irritation of the gum, characteristic of band crowns, is entirely absent.

Lastly, it has strength to withstand severe use in the mouth. As a shell uncemented it is frail, but when thoroughly supported by cement it has the endurance almost of the natural enamel.

The Porcelain Body. The porcelain body used in constructing these shells is what is termed block body, or porcelain tooth body. It is prepared by taking the bicuspid and molars of a set of diatoric (pinless) teeth and pulverizing them in a wedgewood mortar.

One tooth at a time is taken in the mortar and when it is fractured into a number of small pieces, they are emptied upon a sheet of white paper and an assortment made, separating the pieces composed of the clear blue, or characteristic color of the cusps of the tooth from the remaining yellow, which forms the bulk of the tooth. The blue is powdered separately from the yellow and the amount of each



ITEMS OF INTEREST

obtained from a set of four molars and four bicuspid gives us sufficient body of these two shades to last some time. Four shades of body, two blues or grays, and two yellows are usually all the variety needed in this work when a veneer is used. This very high fusing body has several advantages for this work over the *so-called* high fusing bodies found on the market.

First—The body is of exactly the same material as the veneer, so that when completed the shell is of one grade of porcelain. The advantage of this is, that the union of veneer and body is more complete, although, the body having been once fused and refritted, fuses at a little lower temperature than it did the first time.

Second—There is less shrinkage.

Third—There is not the liability to cracking or checking upon cooling that there is when a lower grade of body is used in connection with the veneer.



FIG. 21.

Fourth—No matter how many times the work may be fused, there is no danger of its becoming porous if it is kept absolutely clean, but a lower fusing body will frequently become porous when fused a number of times, due to the burning out of the flux which it contains.

What is known as *low fusing* (gold matrix) porcelain has no place whatever in connection with this work.

"A" (Fig. 21) is a plaster model of a typical case of malformed enamel due to impaired nutrition from birth, to about four years of age.

Model "A" was made in June, 1902, after which the irregularity of the teeth was corrected, and in July, 1903, the six anterior teeth were covered with porcelain by the process just described. "B" is a model of the case after it was completed. Age of patient at completion, nineteen years.



The Great First Class of Malocclusion.

By DR. H. A. PULLEN, Buffalo, N. Y.

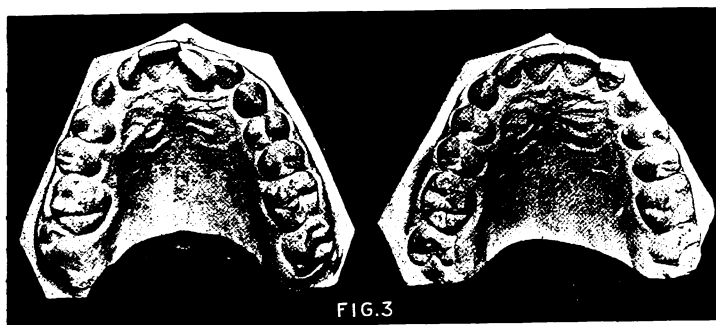
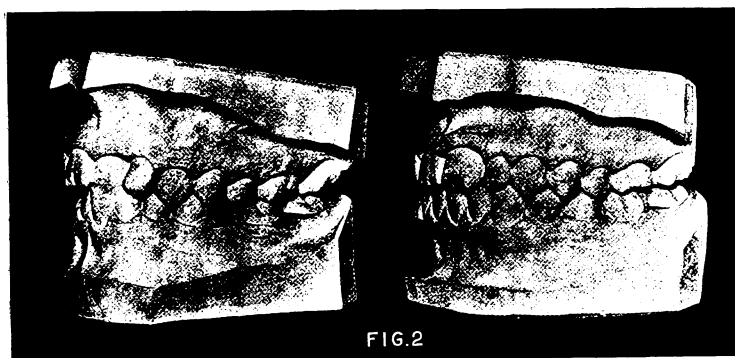
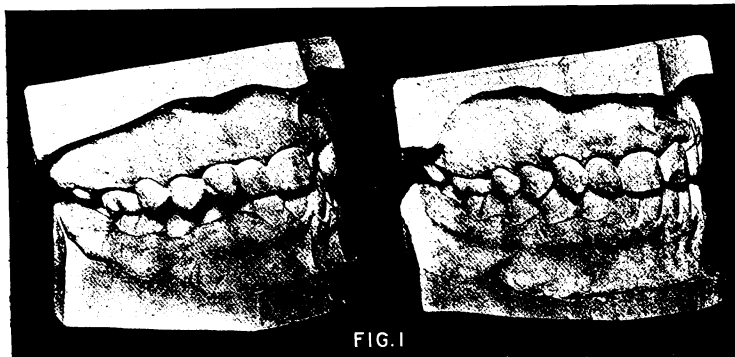
Read before the American Society of Orthodontists at Buffalo, N. Y., January, 1904.

The vast field included in the class indicated in the title of this paper precludes any attempt at doing it justice as a whole. Its proper consideration would fill a volume. I shall only attempt to repeat a chapter of my experience in the diagnosis and treatment of this class of cases, which is very likely similar to that of many others present, and which will only bear repetition because of your forbearance with an enthusiast, who is working towards an ideal, which can never be pointed out too often. The attainment of normal occlusion is like the solving of a difficult geometrical proposition, the interest increasing with the difficulties, and there is present a certain fascination which causes us to persevere and overcome obstacles until the desired result is obtained, or its impossibility assured.

Including, as it does, Class I., Angle's class, the largest percentage of cases that present, within its sphere of treatment may be found our greatest experience in the correction of malocclusion, and consequently, our greatest number of successes or failures.

The arches of teeth being normally related mesio-distally, it would seem that the diagnosis and prognosis of this class of cases would be easy, but if it were not for the fact of the dependence of diagnosis on occlusion, we would certainly be puzzled over some of the cases that present, for of all the three classes and their subdivisions, the first presents the most misleading characteristics, especially if the facial lines are taken as a guide rather than the occlusion.

ITEMS OF INTEREST



The diagnosis of this class indicates the restoration of normal occlusion through expansion of arches and placing of the occlusal inclined planes of the cusps of the teeth of one arch in harmony with those of the other, excluding extraction as a beneficial procedure, except in rare cases. In cases where extraction has already been resorted to, the restoration of lost spaces should be accomplished, and retained by proper methods.

Case I. Fig. I. represents the right occlusion, before and after treatment, of an average case of this class, the arches being contracted and the anterior teeth in various positions of malocclusion previous to treatment, and afterwards in normal occlusal relation.

The left occlusion, in Fig. II., illustrates the movement of the left central from lingual to normal occlusion, and the regaining of the proper space for, and restoration, or rather, eruption, to normal position of the lower second bicuspid on the left side.

Fig. III. exhibits the restoration of the normal shape and size of the upper arch, the teeth being placed in the line of occlusion, as noted in the cast on the right of this picture.

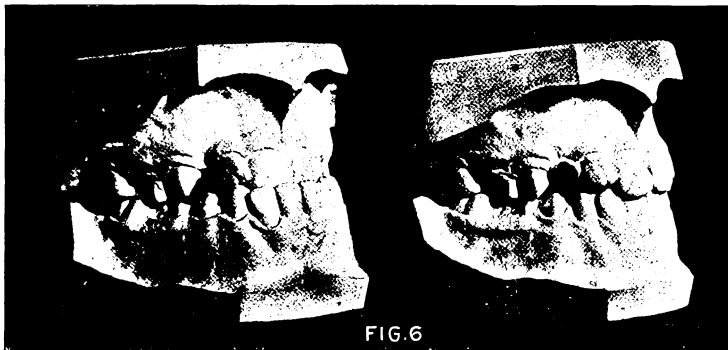
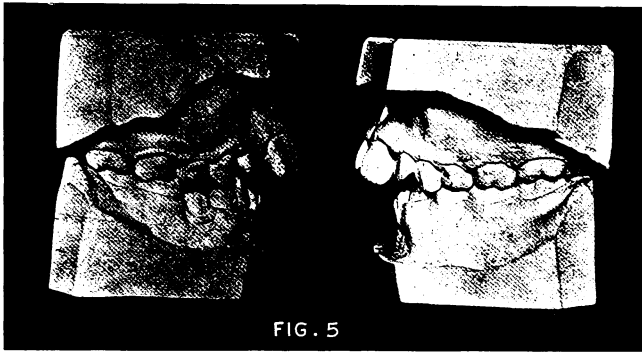
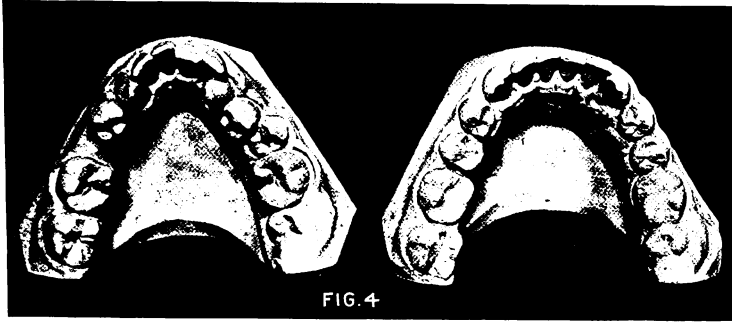
Fig. IV. presents the chief difficulties encountered in the case, and the attainment of the same ideal shape of the arch as a final result. The lower unerupted bicuspid very quickly took advantage of its release from imprisonment between the first bicuspid and molar, and erupted into occlusion without mechanical aid, and became a keystone to hold the arch intact.

Thus we have obtained a harmoniously aligned and occluded denture, and reached the ideal which we desired.

Case II. The next models, shown in right and left occlusion in Fig. V., might, at first glance at the anterior teeth, be taken for a case belonging to Class II., the first division of which represents protruded upper incisors, and a distal occlusion of the lower arch, but when the occlusion in the molar region is noted, it will be seen that the case is clearly Class I., being normally related mesio-distally, and the protrusion of the incisors, and the appearance of the facial lines is not sufficient to diagnose or classify the case.

Proper treatment follows the same lines as the preceding case in the restoration of normal occlusal relations.

Case III. Fig. VI. represents the right occlusion of a boy ten years of age, before and after treatment, and the temporary retention of the space for the unerupted cuspid. The crown on the upper first molar is not the work of a Buffalo artist. I am very positive that there was no necessity for its mutilation in this way.



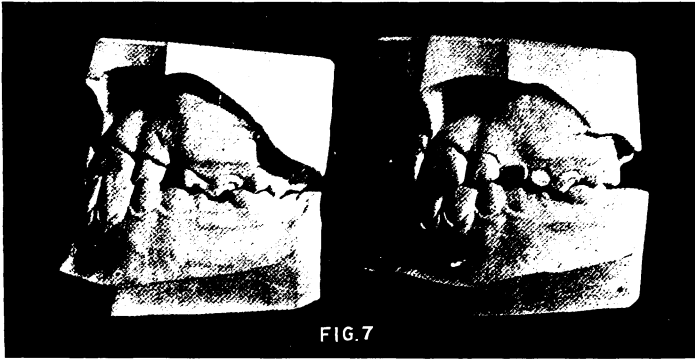


FIG. 7

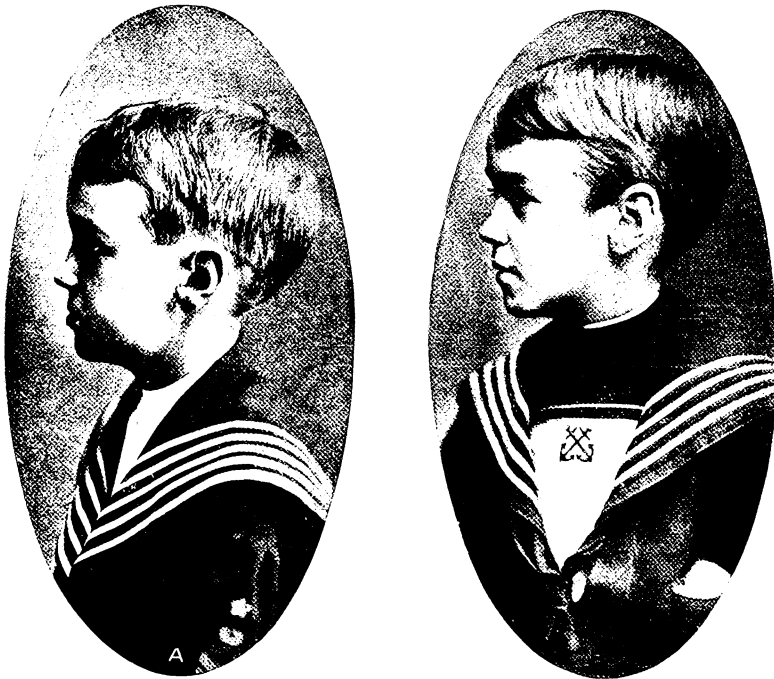


FIG. 8.

ITEMS OF INTEREST

The left occlusion of the case in Fig. VII. exhibits a more artistic appearance and shows the relationship, before and after treatment, of the left side in occlusion. In this case, also, if one were to judge by the appearance of the anterior teeth, it might be thought to belong to Class III., in which the lower arch is mesial to normal, for the same characteristics are present anteriorly.

The facial lines in Fig. VIII. A, tell the same story, and unless the occlusion in the molar region were noted, a mistake would not have been unlikely in the diagnosis and treatment. The improvement in the facial lines after treatment is very marked, the upper lip being brought out to its proper position and contour. (Fig. VIII. B.)

Restoration of normal occlusion is not always possible in every case of this class, even when the diagnosis seems to indicate it, as illustrated in Fig IX., which shows the right occlusion of a case in which I found it impossible to find space for, or to place in its normal position, the right upper lateral incisor. The case looks easier than either of the two previous ones illustrated, in which normal occlusion was restored, but looks are sometimes deceiving. The central and cuspid in the completed case are shown adjacent to each other, and the lateral had to be extracted, because of its abnormal shape and position, as will be shown a little later.

Fig. X. shows the left occlusion of the same case before and after treatment, but no feature of any importance.

Fig. XI., the occlusal view of the upper casts, before and after treatment, pictures the condition of affairs, and the malformed lateral is seen on a bit of wax on the left cast. An attempt was made to align all of the anterior teeth except the lateral first, and then it was found that there was not room for it, and the abnormality was only discovered on its extraction. If I had been able to make space for this lateral, I would never have been able to place it in position in the arch.

The peculiar bayonet shape of the root rendered its extraction very difficult.

The most interesting case (Fig. XII.) I have reserved until the last, because it presents certain difficulties of treatment which seemed almost impossible of overcoming without a faith in the possibilities of occlusion strong enough to be equal to any emergency, or remove any obstacle in the way of accomplishment of the restoration of normal occlusion, after having once decided that it was within the range of possibility. The diagnosis of the case may be made from this picture, and the next, which show the right and left occlusion of the case before and after treatment. The case is that of a boy fourteen years of age, and in the model of the right occlusion (Fig.

Case U.

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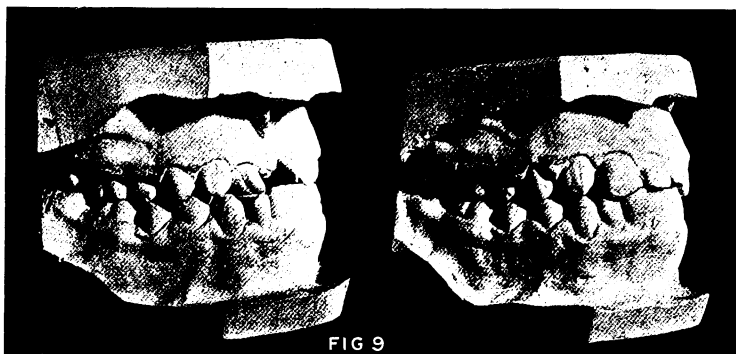


FIG 9

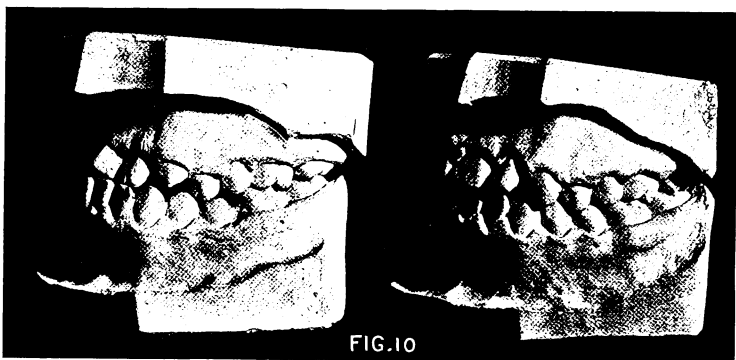


FIG.10

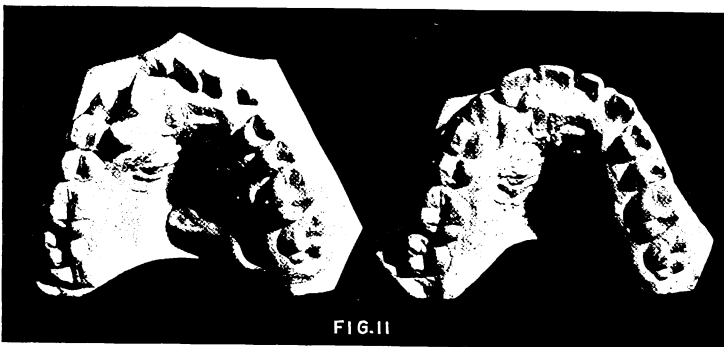


FIG.11

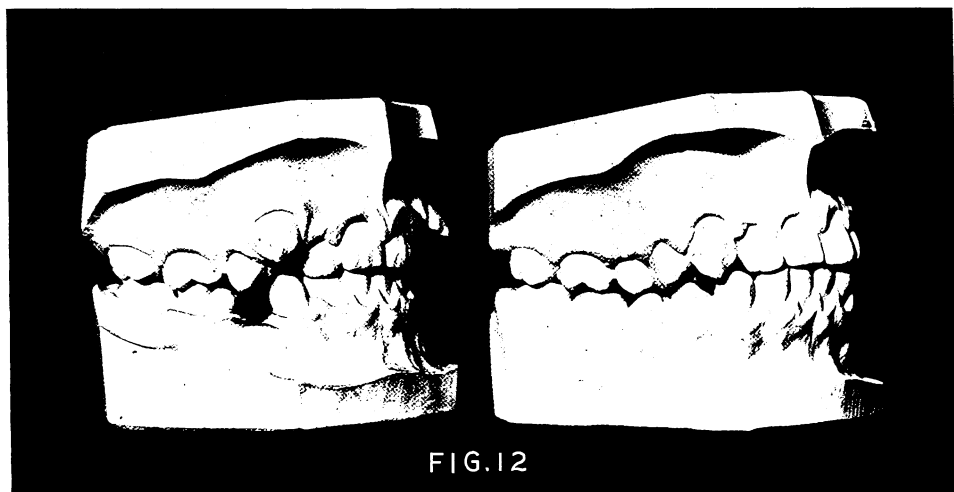


FIG.12

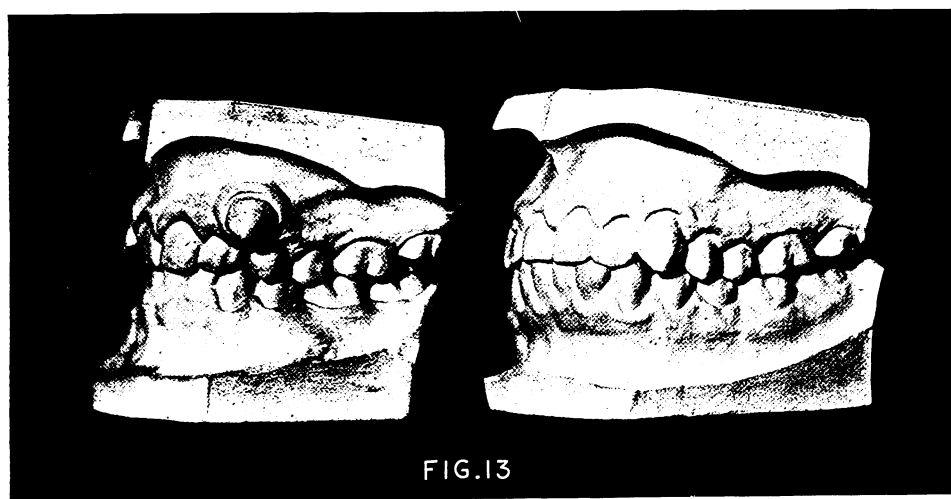


FIG.13

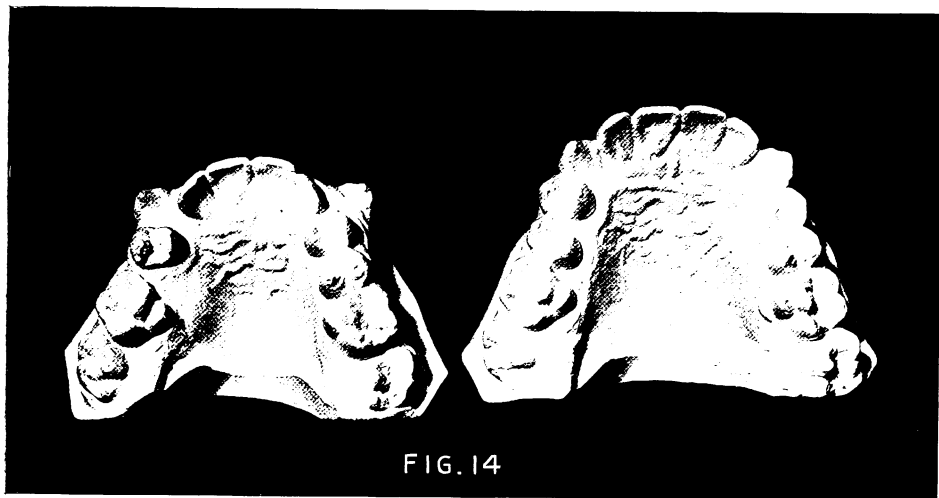


FIG. 14

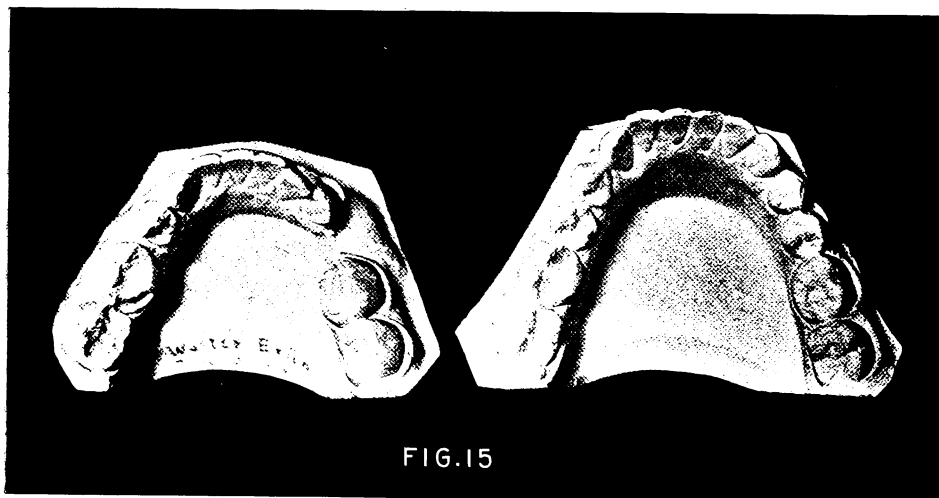


FIG. 15

ITEMS OF INTEREST

XII., left model) may be noted the contraction of the arch, the closing up of the space for the upper second bicuspid, and the partial closure of the space for the lower bicuspid, which have bunched up outside of the arch, as appears.

The model on the left of Fig. XIII. shows the contraction of the arch and the complete closure of the space for the upper cuspid and the lower second bicuspid.

Fig. XII. illustrates the right occlusion, before and after treatment, and the restoration of normal occlusion.

Fig. XIII. shows the left occlusion, before and after treatment, and I think it is the best result I ever hope to obtain. The facial lines are normal, there being no protrusion after treatment, as might have been expected in such a case.

Fig. XIV. shows the occlusal view of the upper, before and after treatment; in the cast on the left may be noticed the complete closure of the space for the left cuspid and almost complete closure of the space for the right cuspid, also the closure of the space for the right second bicuspid, which lies embedded in the process lingually. This view also shows the extraordinary enlargement of the arch for the accommodation of these teeth in the cast on the right.

Fig. XV. shows the peculiar conditions existing in the lower arch (see cast on the left). The two bicuspid on the right side are bunched up buccally, with only half the necessary space for them in the arch. On the left side, the space for the second bicuspid is completely closed. The cast on the right illustrates the response to treatment.

An interesting feature of the case was the eruption of the unerupted teeth almost immediately after space was obtained for them in the arch, and only the slightest traction was needed to bring them into position, Nature doing her part grandly when the opportunity was given.

Last, but not least, the retention was the simplest of any case I have ever undertaken of like difficulty. After wearing spur retainers on the cuspids for about three months, all retainers were removed and occlusion was depended on entirely for the permanent retention, and it presents the same appearance today as when completed.

Discussion of Dr. Pullen's Paper.

I wish to express my very great appreciation and admiration of the work Dr. Pullen has shown us in the treatment of this great first class of malocclusion, because it shows me what are among the easy possibilities for a man who will specialize, provided he has the requisite aptitude

and love for this work, coupled with the necessary artistic instinct.

Then again, I am greatly pleased, because his work confirms my own theory and firm belief that the old plan of extraction in these cases was as unnecessary, as wrong, and that the best results are only attainable by not extracting. But on this point, I think most of us here are now well agreed, so we do not need to argue it further; but to discuss it with the practitioners of general dentistry is much like attempting to talk the waves of the ocean into silence. They have so long been imbued with such bad teaching, and the principle is so strongly entrenched in their understanding of the requirements of orthodontia that nothing, I fear, will persuade them differently, and if we cannot impress teachers in our dental institutions with the folly of their pernicious doctrines, how can we expect much of the product of their teaching?

Dr. Pullen is to be congratulated. I carefully studied the models of his last case, some months ago, and I consider it a triumph of the art of occlusal restoration. I doubt if there is a case recorded in our literature that parallels the skill of the achievement.

Dr. Ottolengui. I would like to have a point explained. Where the lateral was extracted there was no explanation made as to how this was to be compensated for, either in the upper or lower arch.

Dr. Eloyd S. Lourie,
Chicago.

Dr. Pullen. In answer to Dr. Lourie's query concerning the compensation in occlusal relations in the case in which the upper right lateral was extracted, I would say that the occlusion in the anterior part of the two arches was harmonized by the slight contraction of the lower arch, due to the torsion of the lower right central incisor, together with a slight spacing between the upper incisors.

I certainly feel highly complimented by the remarks of Dr. Ottolengui concerning this last case shown, and I feel a stimulus towards renewed efforts in attempting apparently impossible cases which present.

Influence of the Premolar on the Profile.

By C. L. GODDARD, A. M., D.D.S., San Francisco, Cal.

Read before the American Society of Orthodontists at Buffalo, December, 1903.

The Ideal Profile. The treatment of irregularities from the standpoint of the occlusion has caused us to pay more attention to the profile than heretofore, and to study means by which the profile may be improved and brought nearer to the standard.



ITEMS OF INTEREST

The profile of Apollo has been our model, but the cut most often used from Bell's *Anatomy of Expression*, is faulty. (See Fig. 1.)

Dr. Angle's "line of harmony" described as a straight line touching "the most prominent points of the frontal and mental eminences and" passing through "the middle of the ala of the nose" is correct, but the drawing is wrong. The nose is not prominent enough. The line nearly bisects the nose itself instead of the ala.



E.H.A

Fig. 1.
Bell's Apollo.



FIG. 2

Apollo Belvidere (photograph from cast)

In order to test the correctness of this drawing and to study this profile, I went to the Hopkins Institute of Art of the University of California and carefully took a photograph of a cast of the original statue of Apollo which stands in the Belvidere of the Vatican, and which is known as the Apollo Belvidere. You will see (Fig. 2) that a straight line touching the most prominent portions of the forehead and chin does actually bisect the ala, or, in other words, cuts off two-thirds of the nose. The line also passes through the extreme edge of the lower lip, while considerable of the profile of the upper lip lies outside.

We find that the nose is actually a much more prominent feature than the first drawing led us to suppose, and that an actual profile agreeing with the first lines, is too flat. Either the chin is too prominent or the nose is not prominent enough.

Although we cannot expect to attain this perfect profile in all our work, it gives us a standard toward which we may strive. Every step toward that standard is a step away from deformity and ugliness.

The nose, chin and forehead may be in the true line of harmony and yet the profile may be distorted from a malposition of the lips alone. Both may be too prominent or too retreating, or either one may be out of line in regard to the other. An undue prominence may be due to actual thick-



Fig. 3.—Double Protrusion.

ness of the lips themselves, or may be due wholly to the prominence of the anterior teeth, both upper and lower. Both arches of the teeth may be normal and the occlusion may be normal. There may be no irregularity and no malocclusion, yet there may be a deformity which stands wholly outside of Dr. Angle's most excellent classification.

If the prominence were wholly of the upper teeth we would call it a case of upper protrusion. If it were wholly of the lower teeth we would call it lower protrusion. There is a prominence of both upper and lower teeth, and I have called it "double protrusion." Such a case is illustrated in Fig. 3.

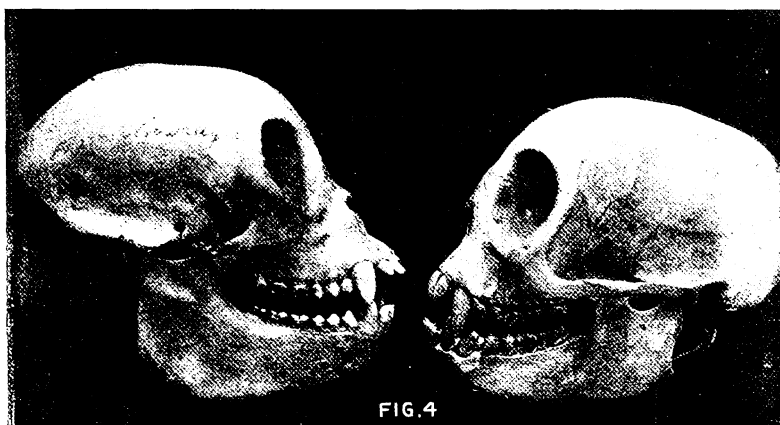
Both jaws are normal and the nose is normal, but the arches are too large. *The teeth* are too large for the maxillae, or, as comparative anatomists call them, the maxilla and the mandible. What may have been the cause of this, none of us know.

We were taught, years ago, that "a child may inherit large teeth from one parent and small jaws from the other." Recently the possibility of that has been denied, but who knows? A child may inherit his shape from

ITEMS OF INTEREST

one parent and the color of his skin and hair from the other. Large teeth and small jaws have been considered one of the frequent causes of irregularity.

Irregularities. In parenthesis let me say that I am not yet ready to give up the old term, "irregularities" for "malocclusion." If eruption is normal and there is no irregularity, there will be no malocclusion. If there is maleruption there will probably be irregularity of the teeth *producing* malocclusion. Malocclusion is the result, not the cause, of irregularity. If the irregularity is properly corrected, normal occlusion will be established.



New World Monkey.

Old World Monkey.

The term "irregularity" has been used so long that it is thoroughly understood by our patients. This is the defect that they notice and desire corrected. The fact that it results in malocclusion must be explained to them carefully as well as the fact that the treatment of irregularity must be such as to produce normal occlusion as nearly as possible.

Comparative Anatomy.

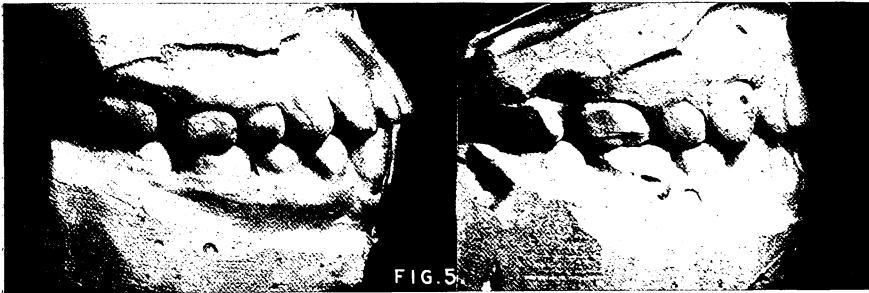
Let us see what comparative anatomy teaches us about the profile. The normal dental formula is $I \frac{3}{3} C \frac{1}{1} P \frac{4}{4} M \frac{3}{3}$. The six incisors in each jaw provide a full anterior dental arch. The four premolars and three molars on each side provide long sides to the arch. In most animals these sides are nearly parallel. Only two living animals are known to have the normal dental formula, the hog and the mole. In some animals there is an absence of the incisors (the edentata), in some an absence of canines (the herbivora), in others some or all

of the premolars are wanting (the rodents), and in others still some of the molars are missing (the carnivora).

In most animals that are deficient in canines or premolars, or both, there is a large diastema between the incisors and the molars, owing to the length of the jaws. In the same family there may be a crowding of premolars or there may be spaces between them, according to the length of the jaws, as in short-jawed and long-jawed dogs.

For our comparison we must take the animals most nearly resembling man, the quadrumana. If we select from the old-world and the new-world monkeys, two that most nearly resemble each other in size, we will find quite a variation in the facial angle (Fig. 4).

The incisors of the new-world monkey are more prominent than those of the old-world monkey, but why? Count the premolars. The one has three premolars and the other but two. By reducing the number of pre-



molars from three to two the profile is straightened and the prominence of the incisors is reduced.

Do not misunderstand me as saying that this is done directly, in evolution from a monkey with three premolars to one with two. Nature does not work in so direct a manner, but in two long lines of descent from an ancestor with four premolars, the one that has lost the greater number has the straightest profile.

What does this teach us? It teaches us that, in a case where prominence of the lips is due to prominence of the incisors, and a deformity is the result, we may reduce this prominence by removing one of the premolars from each side of each jaw, then moving back the anterior teeth.

If the removal of this one tooth gives too much room the posterior teeth may be moved forward by a reciprocal appliance.

This treatment is well shown by a case of double protrusion first illustrated by the author in the American Text Book of Operative Dentistry (second edition, 1900, pp. 783, 784). (See Fig. 3.)



ITEMS OF INTEREST

The relation of forehead, nose and chin was not bad, but the apparent thickness of the lips was due to the prominence of the anterior teeth as shown by the plaster casts in Fig. 5 A.

Both arches were normal in shape. There was no irregularity nor malocclusion—only deformity. The face and jaws were small, the teeth were too large for the other features. The four first premolars were extracted and the anterior teeth moved back, as shown in Fig. 5 B, so that their labial surfaces had a more vertical position. The posterior teeth at the same time moved forward slightly, without tipping.

Fig. 6, A and B, show how much the arch was shortened.

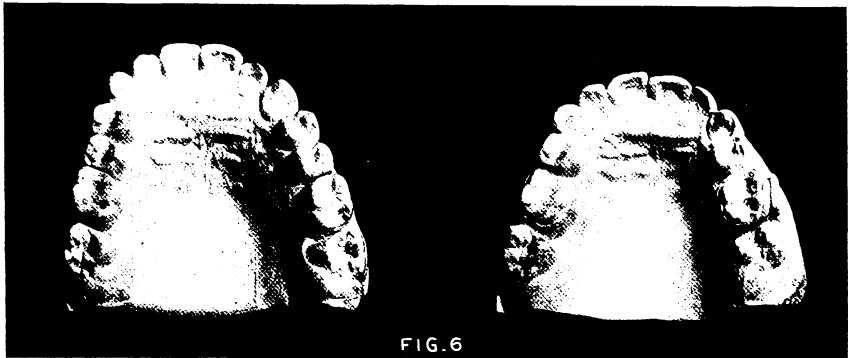


Fig. 7, A and B, shows the result. The prominence of the lips was reduced and the general contour very much improved.

It is to be regretted that these two photographs were not taken in full profile so as to show more exactly the change produced but it must be apparent to you all.

The reduction was accomplished by means of two bows, the ends of which entered tubes on molar bands and were tightened by nuts behind the tubes, Fig. 8. In addition an occipital appliance was used with a bit that rested on the upper and lower anterior teeth. It was worn at night and part of the daytime. This is the only case I know of in which the occipital appliance has been made to operate on both upper and lower teeth at the same time.

At the last meeting of the American Society of Orthodontists Dr. Ottolengui showed the same kind of a case, except that it was complicated with irregularity of some of the single anterior teeth. He mentioned also other similar cases, all treated with the same beneficial result.

ORTHODONTIA

These cases teach us that extraction is *sometimes* advisable, in spite of modern teaching to the contrary.

You are all familiar with the text book cut that shows the position of the crowns of the permanent teeth before eruption and while the temporary teeth are in position. The late Professor J. H. McQuillen said: "When we are examining a series of jaws of different ages, arranged so as to show the deciduous and permanent teeth, it is not a surprising matter that there should be irregularity in the permanent set; but when observing their crowded and irregular arrangement in the jaw prior to eruption, it is rather a matter of astonishment that they should ever assume a regular and symmetrical appearance."



If then it is a wonder that teeth of normal size in normal jaws erupt in a regular arch, how much less does it cease to be a wonder that large teeth in a small jaw fail to erupt in proper alignment. It is a wonder, in the case I have reported, that the teeth erupted in such a regular manner and with normal occlusion.

These cases teach us that if we correct irregularities, in all cases, so as to produce arches of normal shape, we shall, in some cases, where teeth are too large, produce arches that are too large for the jaws and that will result in the very deformity we are discussing—double protrusion.

In such cases four premolars might better be removed before the deformity is produced and while there exists only irregularity and consequent malocclusion. After these four teeth are removed the rest can be more readily moved into alignment and normal occlusion of the remaining teeth produced.

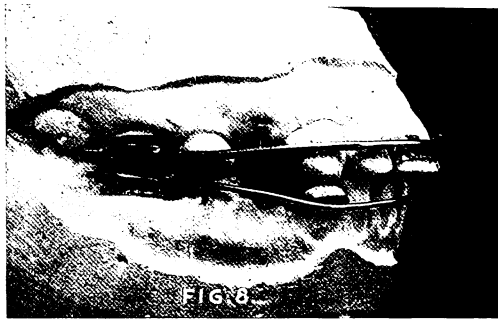
Another thing that limits the extent to which the arch may be enlarged and spread to advantage is the narrowness of the upper maxilla in some cases in which the teeth are of normal size.



ITEMS OF INTEREST

If we could move the roots of molars and premolars buccally as we can of incisors labially (Dr. C. S. Case's method) we might enlarge the arch to any extent, but as the crowns move outward the apices of the roots remain stationary or even move lingually. The result, in an arch spread too much, is that the crowns of the premolars and molars slant outward too much and the buccal cusps are too short to occlude with the lower.

In spreading both upper and lower arches, in cases where both are much too narrow, yet where occlusion of the premolars and molars is normal, and the irregularity is confined to the anterior teeth, the operation may be carried so far as to produce malocclusion. In such cases it is better to sacrifice the first premolars and thus produce a well formed arch corresponding to the maxillae.



Migration of Molars.

Many of you have noticed the tendency of molars to move forward when space is created in front of them by loss of premolars. The author has seen three cases in which the first molar was in contact with the canine and yet was not tipped forward. This tendency is so great that the interlocking of the cusps will not always prevent it, and often proves a great obstacle to our using the molars for anchorage.

If, in a given case, an operator should hesitate about producing too large an arch by moving all the teeth into proper alignment and should think he was almost warranted in reducing the size of the arches by sacrificing the four first premolars, yet should be deterred by fear of leaving space between the canines and the second premolars, or of moving the anterior teeth too far back, he may remember the tendency of molars to move forward and know that this space will probably be filled by that means. If it is not so filled he may readily force the molars forward by means of appliances.



Discussion of Dr. Goddard's Paper.

Dr. Edward H. Angle,
St. Louis.

I do not want to criticise Dr. Goddard too severely because he is a fine man, and I am proud to call him my friend. I think he is honest in making his deductions, but they are so radically different from what I learn from the case he reports that I think he has made a mistake, and I want to point it out.

The point he would make is that in this case extraction was necessary to obtain the best results for occlusion and for the facial lines. And he attempts to prove it. He selects a case that he calls one of typical double protrusion, but he does not say how rare they are. I have seen but one such case. He has selected a very rare case to overturn a theory of mine which I believe has practically an almost universal application; that is, that the full complement of teeth is essential to the best harmony in occlusion and in the facial lines, and I am going to try to prove to you with his own pictures that he would have had better results had he not extracted, but worked in accordance with this theory.

He says the occlusion in Fig. 5 is normal. The models are so poor that they are not at all reliable as a basis for very accurate judgment. I think they were made from wax impressions, and you all know that accuracy from such impressions is impossible. Then again, we ought to be able to examine the arches from the occlusal aspect. If we could do that I am sure we would find them narrowed, and as the result and in the same proportion we would find the incisors protruding.

Now in the treatment, if he had widened the arches laterally and moved the incisors lingually he would, in my opinion, have had better occlusion and more pleasing and harmonious facial art results.

Fig. 6 shows where the doctor has sacrificed four priceless jewels. It is unnecessary for me to enumerate the effects of this to you gentlemen who are familiar with such results, such as changing the normal curve of occlusion, narrowing, as well as shortening the dental arches, thus encroaching upon the normal space and necessary demands of the tongue, together with the different relations, which are here keenly apparent, in the delicate inclined planes of the cusps, etc.

The doctor says that he moved all the incisors and cuspids distally by means of the expansion arch with the nuts placed distally to the tubes on the bands on the anchor teeth, or first molars.* Now I want to tell you

*Dr. Angle overlooks Dr. Goddard's statement that he used an occipital appliance, exerting pressure on both jaws.—EDITOR.





ITEMS OF INTEREST

that no man living ever accomplished what Dr. Goddard thinks he has in this case by such means. I have long been teaching that it was bad practice to subject the molars to such an excessive strain, for they cannot resist it and are invariably drawn forward more than the incisors and cuspids are moved distally, and this result is clearly shown in this case, and I will tell you how it can be easily proven. I discovered the means of determining it in a similar blunder made by Dr. Kells some years ago. It is by noticing the positions of the teeth with relation to the rugae, before and after they have been moved. Now if you will study the rugae in this case you will see clearly that the molars have been moved farther forward than the anterior teeth are supposed to have moved back. How long will men teach such errors?

Now in regard to the art relations of this case; if you will examine the picture of the face before treatment you will observe that it is one of a distinct type, similar to that of George Eliot and Savonarola. We now know that each face is a law unto itself. I once thought we could have a profile line applicable to all cases. I now know that was wrong and narrow. The demands of art will not be restricted. Now we know that we must study types, and that each type differs from all other types, and that the one principle required in each is harmony and balance; that is, the contour of the face both in its profile and laterally must balance. The nose, the chin, the length of the lips, all must be in balance if we would have the most pleasing result. The rules of the straight face cannot apply here because all the lines of the contour are on a curve. To make this face conform to a straight line in the region of the mouth would be to injure it. The curve of the face must be maintained, and all that was necessary in treatment was to soften the prominence of the lips by placing the teeth in harmony with their lines of occlusion, as I have before stated. You will note in the picture after treatment that there is an unnatural appearance about the mouth. The angle of the nose and mouth is not in harmony with the other angles of the face, as it would have been had the case been treated as I suggest. I may be wrong, but all of this is as it seems to me, greatly as I dislike to differ with my friend.

Now, in regard to Dr. Goddard's criticism of the Apollo Belvidere found in my book, I think he is right. There is a difference between that picture and the one he shows, as well as some others I have seen. I cannot account for this difference. Mine was taken from that celebrated work "Bell's Anatomy of Facial Expression" which has long been regarded as the masterpiece of its kind, and I therefore supposed that the picture of the Apollo, coming as it did from this book, was right. Which is right I cannot positively tell. Anyway Dr. Goddard's picture is to my mind the

more pleasing and harmonious in its balance. But, as I have said, we must not depend upon this line except in a limited number of cases. We must be judges of balance and harmony and be able to apply this judgment intelligently instead of depending upon fixed lines.

With the first part of Dr. Angle's discussion

Dr. M. C. Watson,
Detroit, Mich. I agree most heartily. My sense of harmony, or balance, is jarred when I look at the second picture, the one taken after the case was corrected. In my judgment the misfortune in this case is that Dr. Goddard succeeded in doing what he tried to do. That he moved the molars forward, I have no doubt; but he also succeeded in moving the anterior teeth back, and that is what has ruined the face. I think the face was much better before treatment than it is now. That it could have been improved goes without saying, but the greatest possible improvement would have been made if the jaws had been widened so as to be in harmony with the facial type of this individual.

I cannot agree with the last part of Dr. Angle's argument, where he speaks of the rugae in relation to the teeth. When we move a lot of teeth *en masse* we do not move them through the process alone, but we carry it along with them, to a degree, at least, which is also true of the gum tissue.

I am very glad that this paper has come up with this case, and I speak on this subject because Dr. Goddard alluded to the fact that I reported a similar case; also because Dr. Angle said that these cases are rare. I have had three such cases, making a total of twelve teeth extracted from three mouths, and I fear that, in a way, I have dishonored myself by creating the impression that I am a tooth extractor. I have been told by a number of gentlemen, who are friendly disposed to me, that I "have no standing on the matter of occlusion." I am sorry to find that to be the case.

Dr. Ottolengui,
New York City,

Dr. Angle said that he had seen but one of these cases. Judging from what he said about its correction, I should say that he has not met even the one case. I imagine that his case was similar to one I had where there was normal occlusion mesio-distally; narrowing of the arches, and protrusion of both jaws anteriorly, with separation of the teeth. That case was corrected without the extraction of any of the teeth. In retruding the incisal regions, after widening the jaws I used an occipital appliance without any inside apparatus. That child was very young, which was fortunate. The widening of the upper arch and the

ITEMS OF INTEREST

relation of the occlusal cusps (the depth of the overbite) was sufficient so that widening the upper jaw also carried out the lower and thus subsequently the lower was widened sufficiently. I used an occipital appliance carrying an inclined plane to engage the lower teeth. There was no strain on the back teeth, and no possibility of dragging the back teeth forward because there was nothing attached to them.

The case I reported last year, I still consider was treated correctly. The child is still under my care. Six years have elapsed since correction, and the face is in perfect harmony. In the other two cases, which are still in progress, I believe I was correct in one case in removing the teeth. But in the second I am in a dilemma because the anterior teeth have curved roots, and I cannot carry the teeth back very much farther without causing an inward tipping of the anterior teeth.

I do not consider that the case illustrated by Fig. 7 required the extraction of four teeth. The first photograph is shown by Dr. Goddard to prove that the case required regulation; but I want to direct your eye to the tips of the nose and the chin and ask you if even with a pouting lip you would not imagine that the lower jaw is in distal occlusion. Has he not accentuated the receding line of the chin and made the face more angular, and the chin more retrusive than it was before?

I agree with Dr. Angle that every face must be a law unto itself, and that you must have in mind the beauty of that particular face and realize the unchangeable fixed points before you make any alteration. If you will look at the models again you will see that they are asymmetrical. They could have endured widening to a sufficient extent to reduce the frontal prominence which, really, required very little reduction, provided the chin was left unchanged.

Dr. Goddard says that both arches are normal in shape; there is no irregularity, no malocclusion; there is a deformity. Do all the gentlemen agree that the model made before correction of the teeth shows a normal occlusion of the anterior teeth. These teeth protrude and are therefore out of the normal line of occlusion.

I want to call attention chiefly to the malocclusion that existed, in spite of the author's statement to the effect that there was no malocclusion, no irregularity, only deformity. Malposition of the teeth is a form of irregularity, and whenever a tooth is in malposition it must be in malocclusion. I cannot conceive of a tooth being in malposition without being in malocclusion. The doctor is mistaken. There is malocclusion because there is malposition of the anterior teeth.

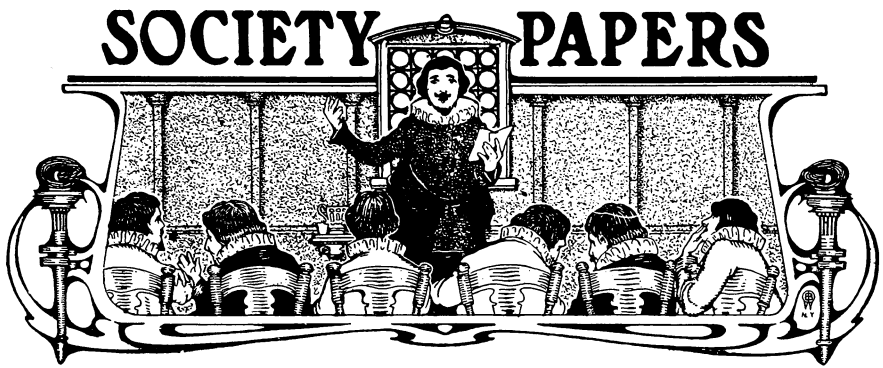
ORTHODONTIA

What Dr. Summa says is not what Dr. Goddard means. I think he understands that the Angle classification is based upon the mesio-distal relations of the molars, and that in this case is normal. Of course, the anterior teeth are all in malocclusion. Dr. Watson takes exception to Dr. Angle's declaration that by the rugae we can determine the distance and direction of the movement of teeth. Dr. Watson says that the process and gum tissue to some extent at least move with the teeth.

I have done a lot of occipital work. For a number of years I operated extensively on protruding cases with skull cap and the mouth bit, and it was a constant and invariable experience that in the movement of the teeth backward the gum remained exactly where it was; the teeth slipped under it and the soft tissue peeled away from the bony tissue below, so that it was necessary from time to time to trim it off with scissors. That indicated that the work was progressing too rapidly. That was when I had an assistant who was in such a hurry to get through with the work that she put on too much strain. Consequently now in all my occipital work, instead of using bands cut from rubber tubing, and putting on strong bands, I supply my little patient with a box of the smallest commercial bands I can get. The child is sent away at first with just enough of the bands on to hold the appliance in place, and by adding more rubbers the strain is increased; the child can reduce the strain by taking off some of the rubbers. Since I have done this I have not had to excise any of gum tissue.

But this shows that the gum tissue does not move, but that the bony tissue in the path of the movement is resorbed. Dr. Angle is perfectly right in saying that we can use the rugae for comparison to tell whether or not the teeth have been moved. Take a point in the center of the vault, and this being unchanged by tooth movement will prove a reliable point from which to make measurements.





Insertion of Artificial Dentures.

By L. P. HASKELL, Chicago, Ill.

Read before the Second District Dental Society, January 11, 1904.

I have chosen for my subject the "Insertion of Artificial Dentures," as it covers a broader field than the one your committee suggested.

I do not appear before you with any new fads or theories, but simply with a plain unvarnished tale of the results of fifty-nine years' experience with artificial dentures.

By way of preface, I want to say that the instruction in dental colleges, in the matter of artificial dentures, in some respects, is seriously deficient. Too much of the student's time is taken up in the lecture rooms in the effort to tell him how to do some mechanical thing. He cannot comprehend it, and it is only when he sits at the bench, tools in hand, under the eye of a competent demonstrator, that he understands what he is to do.

Then in the laboratory it is too often the case the demonstrator is inexperienced, perhaps a last year's graduate. There is no place in the Dental College where experience is more necessary.

The student is often confused with too many methods. The instructor should confine himself to a well-established and simple method of his own, which he knows produces satisfactory results.

Finally, it should be impressed upon the student not to shirk, as is too often the case, laboratory work, because prosthetic dentistry covers a field so much broader than the operative; it requires more time and closer application.

The introduction of vulcanite into dentistry more than forty years ago has produced unfortunate results in some respects. It is by no means an unmixed evil, for rubber has its uses more assuredly. Its chief objection is the fact that

Vulcanite.

its non-conductibility produces constant change in the alveolar process in at least 80 per cent of mouths. A close observation in the use of rubber for more than forty years, after many years previous experience with metal plates, has established the truth of the theory in my own mind.

With me, the first requisite in the construction of an artificial denture is a plaster impression, taken high over the cuspid eminence. Carefully filled, the model from this should be so shaped as to drop readily from the mould.

The most important consideration in securing
Adhesion. adhesion to the jaw, I will illustrate with these models. Every dentist is aware of the fact that the palate is the only portion of the jaw which does not change while the alveolar ridge is subject to change, especially under rubber plates, owing to the retention of undue heat. Unless provision is made for this change, it is only a question of time when the plate will rock over the hard center, and there will be constant displacement of the denture. If the usual vacuum cavity is used, the anterior and posterior margins will rest and rock.

The remedy is simply placing, for metal plates, a thin film of wax with undefined margin over the hard palate, from near top of the ridge to within $\frac{1}{4}$ -inch of the posterior margin of the plate, and the plate should be extended farther back than is usually done. This is the only change I make in the model, never any scraping of impressions or models.

This hard condition of palated surface is found in 98 per cent of jaws, while in 2 per cent there is a soft condition, usually accompanied by a crevice. In these 2 per cent of cases no change of model is needed, but fit the plate snugly to the whole surface of the palate.

The next suggestion I offer is the use of oiled
Die Making. sand, because it is always ready for use, and avoids the delays of moistening the sand whenever a die is to be made. I prefer the use of lard oil, as then the sand does not cake and no sifting is ever needed.

A proper moulding ring is made of heavy sheet-iron, 3 inches deep and 5 inches in diameter. Use a potato masher for packing the sand.

More than fifty years ago I introduced babbitt metal into the laboratory for dies, after having used zinc type-metal, tin, etc., and have continued the use ever since, for the reason that it is the only metal having all the conditions requisite for a dental die, viz., I want non-shrinkage; sufficient hardness to not batter, tough enough not to break, and a smooth die. It has another quality, melting at a low temperature, but it must be a proper babbitt, as follows: Copper, 1 part; antimony, 2 parts; tin, 8 parts. This formula of metal is to be had at dental supply houses.

Pure lead cannot be poured upon babbitt metal without danger of

ITEMS OF INTEREST

uniting, so I reduce the melting temperature by the addition of tin, one part to five of lead; coat the die with whiting and stir the lead until it begins to thicken.

Of course, the process of swaging you are all familiar with, and also the attachment of teeth by the use of rubber.

To avoid the use of rubber in full upper dentures, **Aluminum.** when the patient cannot afford gold or platinum, aluminum is an excellent substitute. I have used it many years and find no objection to it. The plate should be at least 20 gauge, and the attachment always by the use of the loop punch. In swaging this metal, as it is soft and will tear easily, the portion of the counter-die which closes into *under cuts* should be cut away. The mallet should not be used on the palated surface, but use a pad of wet paper to drive the plate into place.

Flat, ridgeless jaws, such as those I have here (showing models) can be more successfully fitted by the use of swaged metal plates than by the use of rubber.

In 95 per cent of cases plates can, and should be, worn higher over the cuspid eminence and the gum fullest, than elsewhere, and as high as possible all around.

When it comes to the insertion of lower dentures, **Lower Plates.** I often say to patients, "Had I no more trouble with lower plates than with upper ones, I should be happy, but they are the bane of the dentist's life. In a great majority of cases in my hands, no ridge is left, as for some unknown reason, absorption takes place, no matter what plate is worn, until it is a flat, narrow surface; the membrane, often loose and more sensitive than upon the upper jaw." In addition to this, in many cases, the muscles, glands and loose membrane rise higher than the surface of the jaw, so that if the lingual margin of the plate extends below the margin of the ridge, the plate is lifted and moved about, necessitating cutting away the lingual margin almost entirely.

For many years I advocated additional weight on the lower jaw, but upon making use of a Watts metal plate, upon my own jaw, which is flat, it would slide forward in leaning over, and was so annoying I gave it up. Furthermore, I find from personal experience that weight is not needed upon the lower jaw, and, I may add, is not objectionable on the upper jaw, as in the use of continuous gum work, which, after fifty-two years' experience, I can assert is the only ideal denture, when properly made, being the strongest, most durable, most natural in appearance, and only absolutely clean work.

The Insertion of Artificial Dentures.

By N. C. LEONARD, Nashville, Tenn.

Read before the Second District Dental Society, January 11, 1904.

In accepting the invitation of your committee to appear before you this evening in the consideration of the subject announced, it was with much misgiving as to my ability to interest you in a question that has already been so much discussed and about which the ideas of the profession seem so fixed and harmonious. But believing that there is still a lack of proper conception of the physical principles involved in the construction and retention of artificial dentures, and that even a possible error in the teaching of one of the learned professions should afford sufficient reason for an evening's discussion, my honesty of purpose, together with a careful study of the subject and a confident belief in the correctness of the conclusions I have reached, have relieved me of much of the trepidation that I should otherwise have felt.

For a number of years I have been quite skeptical concerning the truth of the somewhat dogmatic teaching that atmospheric pressure is the principal force concerned in the retention of a simple upper plate, and my recent study of the question has convinced me that this unbelief is not without a reasonable foundation. In fact, my conclusions would indicate almost the entire elimination of atmospheric force as one of the factors in the retention of dentures.

A clear understanding of the forces concerned, and of the laws governing them, is essential to an intelligent application, or a proper conception of the relative part played by these forces in sustaining the weight and resisting the force that tends to dislodge the plate.

Atmospheric Pressure Defined.

Atmospheric pressure is simply the weight of the atmosphere, which, by nature of its peculiar physical nature, manifests itself with equal force in every direction. At sea level this pressure is about fifteen pounds to the square inch of surface, and as it is the same upon every surface the weight of an object is not affected by it, excepting to the extent of the actual weight of the volume of air displaced; that is, the force being equal in all directions makes a perfect balance, which, being constant, is not perceptible. An unbalance may be created, however, by lessening the pressure on one side of a body by removing a portion of the atmosphere and thus creating a partial vacuum. This unbalance is in direct proportion to the volume of air removed from a given space.

ITEMS OF INTEREST

Adhesion Defined.

Adhesion is another force that must be taken into consideration and given a prominent place as one of the principal forces concerned in the retention of a plate. This is one of the molecular forces similar to, if not identical with, that of cohesion, and which manifests itself principally between solids and fluids. It is this force that makes it possible to wet the surface of a body, and is the reason for the clinging of drops of water or fluid to a solid. Adhesion may also manifest itself between the surfaces of solids brought into close contact.

One of the simplest illustrations of the force of adhesion may be made with two plain glass plates. By moistening the surfaces and placing them in contact we find that it takes considerable force to pull them apart; in fact, well-fitting plates with a film of water between may be made to sustain a weight of from a few ounces to several pounds to the square inch, the amount of weight sustained depending upon the degree of adaptation of the two surfaces. This is a case of simple adhesion, in which atmospheric pressure does not even play a part.

It seems to be a popular belief that in the physical arrangement just suggested atmospheric pressure is the principal force that must be overcome in the separation of the two plates when the separating force is applied at right angles to the surface.

In opposing this belief I wish to state that my position is thoroughly consistent with recognized physical laws, and in eliminating atmospheric pressure as one of the forces concerned all of the phenomena may be scientifically accounted for. While it is true that in this experiment the atmosphere is excluded from between the glass plates its force is transmitted hydrostatically to the inner surfaces through the film of water that fills the interstice and a perfect equilibrium is maintained.

To illustrate this point a little more clearly, we will suppose that in the experiment suggested one drop of water is just sufficient to fill the interstice between the plates when they are adjusted together. This drop is placed on the center of the lower plate. As it rests here we know that it is under pressure of the atmosphere, which exerts upon it a force of about fifteen pounds to the square inch of surface exposed, this force tending to compress it by forcing its molecules closer together, and the molecules resisting, of course, with exactly the same force and in every direction. When the other plate is adjusted it does not in any way relieve this tension of the molecules of water which continue to exert force or react in every direction. In other words, the air acting on the edges of the column of water transmits the same force to the inner surfaces of the plates that would be manifested if the water were replaced by a column of air.

An idea which, it appears, is generally accepted by dentists, and which is taught in some of our leading text-books, is that when the surface of a plate is well adapted in every part to the mucous surface in the mouth, and the air excluded by a film of mucus and saliva, atmospheric pressure is manifested only on the lingual and labial surfaces of the plate, and that this is the force that prevents its dislodgement. This idea is absurd and wholly inconsistent with physical principles, and until it is entirely eliminated from the mind there can be no proper understanding of the true forces concerned and the part which each plays in the retention of the plate.

As in the experiment with the two glass plates, a perfect atmospheric balance is maintained through the hydrostatic action of the film of fluid between the two surfaces, and there is no weight-sustaining force from the air. So far as I can see there is no room for a rational argument on the other side of the case, and it must be admitted that in the physical arrangement illustrated by the two glass plates atmospheric pressure may be entirely eliminated as one of the weight-sustaining forces.

**Retention of
Artificial Plates.**

In the adjustment of a simple upper plate, without the so-called air-chamber, the physical arrangement is practically the same as in the experiment with the glass plates, with two exceptions: First, we have two irregular surfaces adapted and adjusted to each other instead of two plain surfaces; second, that one of the surfaces is soft and elastic. The first is an advantage, since it increases the area of surface exposed to the action of adhesion and prevents largely the tendency of the two surfaces to slide upon each other; the second precludes the possibility of securing the greatest force of adhesion by allowing the force to be overcome gradually from the uneven yielding of the soft tissues.

When traction is made on the plate, tending to dislodge it, the surface of the mucous membrane, by reason of its elasticity and the adhesive force with which it clings to the plate, is slightly lifted; adhesion is first overcome at the edges of the plate and the mucous membrane is peeled off, as it were, the air and excess of fluid following up the separation.

While the entire surface of the mucous membrane covered by a plate has more or less elasticity, we know that usually there are certain areas that are less yielding than others to pressure, either on account of the varying density of the underlying integument or of the close proximity of the bone to the surface. In the surface ordinarily covered by a full upper plate the hard area is that part forming the vault of the arch, and corresponds to the hard palate. When a plate which comes in contact with the entire mucous surface is adjusted in a case of this kind we find that when pressure is made on the grinding surfaces of the molars, and



ITEMS OF INTEREST

bicuspid on one side, as in masticating, the yielding tissues of that side are compressed more readily than those in the center of the arch, and the hard area in the palatal portion acts as a fulcrum; the opposite side of the plate is lifted and may be pried loose, the elastic tissues on that side slightly following and allowing adhesion to be again overcome first at the edge of the plate.

In order to secure the services of atmospheric pressure in sustaining a weight greater than that of the actual weight of the volume of air displaced by the object there must be either a partial vacuum on one side of the body or there must be such a physical arrangement as will prevent the entrance of air or other matters into the space from which some force is tending to remove the matter occupying it.

If a thin, light glass tumbler be filled with water and a piece of plain glass plate carefully placed over it and held till the tumbler is inverted the support may then be removed from the glass plate while the tumbler is held in this position, the glass plate remaining in position over the mouth of the tumbler without the escape of a drop of water.

This experiment illustrates the weight-sustaining power of both forces—adhesion and atmospheric pressure. At first it would appear that atmospheric pressure was the force that sustained the weight of both the water and the glass plate; and here again is a popular fallacy. In fact, weight of the water only is sustained by atmospheric pressure, and that of the glass plate by adhesion. In this case the weight of the water, or gravitation, is the force that tends to produce a vacuum. For convenience we will say that the water weighs exactly one pound and that the area of the mouth of the tumbler is five square inches, representing the section of a column of air, the pressure of which would be seventy-five pounds. If this pressure were manifested only against the under side of the glass plate then the entire force of seventy-five pounds must be overcome before the glass plate can be separated from the tumbler and the water allowed to escape. We know, however, that only a few ounces, at most, will be supported in the position of the glass plate.

The explanation is the same as that in the case of the two glass plates adjusted together; that is, the weight of the atmosphere is manifested equally on both sides of the plate. If we reverse the experiment by placing the tumbler right side up on the table and lift the glass plate we find that the tumbler remains in its position on the table and we have only the weight of the glass and the adhesion of the water to overcome.

To fall within the limits of this essay these statements must be made somewhat dogmatically, as the absolute proof would be too long and technical to include. There is, however, abundant proof to justify these conclusions, which are thoroughly consistent with recognized physical

principles, and they are mentioned here in order to better illustrate the application of these same forces and laws to the subject under discussion.

If the mucous surface of a plate when it is adjusted to place comes in close contact with the mucous membrane at every point we have then, so far as atmospheric pressure is concerned, a perfect equilibrium, and to secure the services of this force in sustaining the weight separation of the two surfaces must occur at some point within the periphery while at the edges the surfaces remain in contact; that is, adhesion must first be overcome at a point within the circumference, while the undisturbed relation at the edges prevents the ingress of air which would re-establish the equilibrium.

Granting for the sake of argument that we have a mouth in which the mucous tissues are tightly bound down to a hard and unyielding surface *only in the center* of the vault, while the membranes covering the rest of the surface possess the usual degree of elasticity and a well-adapted plate be adjusted in this case and pressed well into place in order to secure good contact, then traction be made on it at right angles to the surface, we would find again that the soft parts by virtue of their elasticity and adhesion would be slightly lifted, and adhesion must be first overcome in the center about the area where the tissues are unyielding. The moment that adhesion was overcome at that point there would be created a partial vacuum, over the area of which the atmosphere on the opposite side of the plate would manifest pressure in proportion to the degree of exhaustion of the cavity created. Since the separation of the two surfaces at this point could only amount to the fractional part of a line without breaking up the adhesion to a point where the external air could be freely admitted, and knowing that the mucous membrane has the power of absorbing a considerable amount of air which may be easily extracted from it, we can easily see that the degree of exhaustion obtained would not secure enough force from without to make an appreciable difference in preventing the dislodgement of the plate.

In reality, however, these specific conditions would seldom occur, since the hard palatal portion of the arch usually extends backward to the palatal edge of the plate and consequently air would be freely admitted from the outside the moment that the two surfaces were separated. In any case if atmospheric pressure was the principal weight-sustaining force it would be more strongly manifested during a practical use of the plate while biting on the incisor teeth. Every dentist knows from clinical observation that pressure in this region is the easiest means of dislodging the plate. If traction be made in a downward direction in the incisal region of an upper plate while the distal edge is held in close contact, the traction being sufficient to overcome the adhesion and lift the plate away



ITEMS OF INTEREST

from the surface, a considerable unbalance may be created in the atmospheric force that would aid very materially in preventing the complete dislodgement of the plate.

Since, however, there is no tendency to dislodge the plate in its proper use by force exerted in this direction this point is only valuable in "impressing" the patient. Even this seeming phenomenal resistance to displacement is not in a majority of cases due largely to atmospheric pressure, since traction produced at this point and in this direction must first overcome the greatest force of adhesion.

Air Chambers and Relief Spaces.

An important point for consideration is the relation borne by the so-called "air chamber" and "relief spaces" to the question under discussion. If a cavity of definite shape be made in the palatine surface of a well-fitting upper plate we have, when the plate is adjusted to the mouth, a definite area of surface which does not come in contact with the mucous membrane; that is to say, there is, adjacent to the mucous membrane, a space or recess in the plate containing air. This cavity can be partially exhausted of its air if suction be made with the tongue at the palatal edge of the plate. This causes the soft tissues directly above the cavity to be forced down into it and against its edges, partially filling the cavity and preventing for a time the ingress of air from the outside. Thus a partial vacuum is maintained for a while and the services of atmospheric pressure are secured, but only about the definite area of the vacuum chamber, the amount of force manifested being in proportion to the degree of exhaustion and the area of the space. Over the rest of the surface of the plate a perfect atmospheric balance is maintained just the same as before suction was made. And here again is a point that seems to have been misunderstood by some of our text-book authorities. In the last edition of "Harris' Principles and Practices" in an article in which atmospheric pressure and air chambers are discussed, we find the following statement referring to the oft-used illustration of the "leather sucker" toy used in lifting a flat stone:*

"Traction upon the center, as in the case of a disk of wet leather upon a flat stone, will draw in the edges and create a vacuum in the center. It might be supposed that in this vacuum space lies the power that raises the stone; whereas it lessens the power by reducing the area of stone in contact with the leather, even if the vacuum is perfect."

From this statement we see that the author assumes that the atmospheric force which lifts the stone in this simple experiment is manifested only about the area where the leather remains in contact with the stone. In reality, the reverse is true. The force that does the lifting is mani-

*Page 962, Harris' Prin. & Prac., 13th edition.

fested only about the area where the leather has been lifted away from the surface while a perfect equilibrium is maintained about the part that remains in contact.

But to return to the consideration of the vacuum in the air chamber of the plate: The length of time that this partial vacuum may be maintained, granting that the plate is well conformed to the mouth, is dependent upon several conditions: First, upon the degree of exhaustion and the consequent force with which the mucous membrane is held against the edges of the air chamber, thus modifying the facility with which air or fluid may enter from without; second, upon the sharpness of the angle at the palatal edges of the chamber—a sharp edge making the entrance of fluid, etc., more difficult; third, upon the resistance and porosity of the soft tissues in the region of the air chamber; fourth, upon the amount and quality of mucus discharged from the glands in and around the area covered by the plate, and, fifth, upon the amount of force tending to dislodge the plate.

These five variable conditions modify to a greater or less degree the facility with which the unbalanced atmospheric force re-establishes its equilibrium. We know that mucous membrane has the power of absorbing air which it will readily give up, and that air may even be extracted by suction from the circulation. From these sources, and by the gradual flow of mucus and saliva, the vacuum is soon reduced and the atmospheric pressure equalized.

This is simply illustrated by producing suction on the barrel of a key or small bottle and leaving it attached to the lip or tongue. It will hang till the vacuum has been reduced by air extracted from the tissues, when it will drop off from its own weight. This illustration will also indicate the degree of stasis produced in the tissues under pressure by leaving a blue place the size and shape of the opening in the instrument used, and will suggest the amount of inflammation that would soon be induced by the constant irritation from even a slight vacuum. Should the atmospheric force manifested only about the definite area of the vacuum chamber be alone just sufficient to support the weight of the plate (a less force would scarcely be worth consideration in point of utility), and could other forces be fully eliminated so that the entire weight of an ordinary plate might be suspended by about three-fourths of a square inch of mucous membrane (the area ordinarily covered by an air chamber) it is safe to say that the amount of active inflammation that would be induced in the tissues in twenty-four hours would be unbearable. The fact that a part of the weight of the plate would always be supported by other forces would not lessen the tension of the soft tissues forming one side of the vacuum space, as the force tending to

ITEMS OF INTEREST

reduce the vacuum is constant whether it be supporting the weight of the plate or not. Since the value of an air chamber, as a vacuum chamber, is in proportion to its area the advocates of its practical usefulness are inconsistent who do not insist on extending its area to include the entire palatal portion of the plate, with the exception of a narrow but reasonable margin along the distal edge for excluding the air.

While I do not believe that the so-called vacuum chamber is valuable as a vacuum chamber in securing the services of air pressure, I believe that in some cases good results may be had from its use merely as a *relief space*, and sometimes, perhaps, by interfering to a degree with the lateral motion of the plate in cases where there has been hypertrophy of the membranes into the chamber. I do not, however, deem either of these reasons a sufficient excuse for the insertion of an air chamber, as I believe the disadvantages are greater than the advantages from its use.

In the experiment with the two plain glass plates a significant point is in the fact that if an excess of water be added or allowed to remain around the edges after the plates have been firmly pressed together we find that capillary attraction is so strongly manifested that the two surfaces are forced so far apart that the full force of adhesion is lost and but little weight will be sustained. This illustrates two valuable points in utilizing the force of adhesion for retaining dental plates in the mouth: First, that the closest contact of surfaces is necessary to secure the greatest adhesion; second, that capillarity, where there is an excess of fluid, will interfere with this close contact, and even overcome the force of adhesion altogether by forcing the surface of the plate away from the mucous membrane. This latter point is illustrated by the difficulty of retaining an upper plate in the mouth where there is a profuse flow of mucus and saliva, and it is the removal of the excess of fluid from underneath the plate that is one of the reasons for the frequent pressing up and sucking action of the tongue exhibited by nearly all patients who wear a plate.

An abnormal flow of mucus and saliva is frequently stimulated or induced by the presence of a new plate in a mouth not accustomed to wearing one, and a plate that seemed to fit perfectly at first may appear loose and unstable after a few hours' wear.

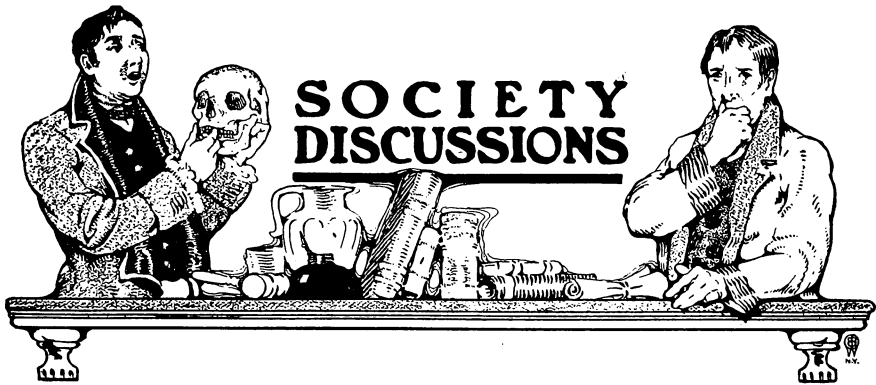
In order to secure the most perfect adaptation of surfaces in adjusting a plate to place considerable force is necessary to secure contact with the mucous membrane at every point, and for this reason it is necessary that the pressure be equally distributed. If there be hard areas in the surface covered by the plate these places will receive most of the force, and in this way interfere with securing good contact with the more yielding tissues when the plate is pressed to place. For this reason the pressure should be "relieved" at these points by carefully scraping the

surface of the impression over the areas corresponding to the hard places in the mouth and the "bearing" increased over the very soft areas by a similar operation on that part of the surface of the model that represents the very yielding tissues.

A few laboratory experiments will illustrate what slight inaccuracies of adjustment of two surfaces will lessen the degree of adhesion. The shrinkage of a modeling composition model for a plate without undercuts will lessen the adhesion of the two surfaces more than half that manifested when the model is first made. This will suggest the inaccuracies that may occur in the construction of dentures as a result of expansion, shrinkage or warpage from molecular changes that take place from the different processes in the materials used in their construction, and will account for many of the difficulties in securing a perfect fit, which may be attributed to other causes.

In a paper so brief as this one must necessarily be, many things that have an important bearing on our subject must be left unsaid, but its incompleteness would be too manifest without a reference to the importance of correct articulation in securing the best results from artificial teeth. But as this part of the subject is of itself a broad field for study I will only emphasize the fact that in order to insure the greatest usefulness of the denture it is necessary to conserve the forces that operate to prevent its dislodgement by so arranging the articulation as to direct the force of mastication as nearly as possible in the line of the greatest resistance.





Second District Dental Society.

January Meeting.

A regular meeting of the Second District Dental Society of the State of New York was held on Monday evening, January 11, 1904, at the Assembly, Fulton and Pierrepont streets, Brooklyn, N. Y.

The President, Dr. Hamlet, called the meeting to order.

On motion, the reading of the minutes of the previous meeting was dispensed with.

Since our last meeting a gentleman who for many years has had his name on our list of honorary members has passed away. I have reference to the death of our friend, Dr. J. Foster Flag, who died recently. His record needs no comment from me. A few years ago, upon an occasion of this kind, he was our honored guest, and this evening is an anniversary of that event. Notwithstanding that at the time of his death Dr. Flag was not a member of this Society, I think it but fitting that we should pay him a tribute, as one whom we all delighted to honor. I move that a resolution expressing our sentiments of regret be sent to his bereaved widow and family.

The motion was carried.

Invitations for this meeting had been extended to the First District Society of New York, the New York Odontological Society, the New York Institute of Stomatology and the Central Dental Association of Northern New Jersey, and large delegations of members from these societies were in attendance.

SOCIETY DISCUSSIONS

The President. It gives me great pleasure to welcome the visiting societies here this evening, and to extend to them hearty good wishes and New Year's greetings of the Second District Society. At the dawn of another year we find ourselves confronted by the various problems pertaining to our profession, and we are wise and progressive enough to be interested in all of them. At each of our annual gatherings we have aimed to present to you subjects, by the aid of our essayists, designed to bring out a good audience, and you have thought enough of our methods to give us a generous response, for all of which we are very thankful.

Not the least of our perplexities are in the art of prosthodontia. I say "art," but there are few of us who bring that art up to such a high degree as do our essayists, who are noted for such work. It has been our great pleasure indeed to secure these gentlemen of universal reputation to discuss this subject for us to-night, and I am sure you will be pleased with the remarks which they will present.

We have been turning our thoughts so often toward the East, to the star that has brightened our path and lighted our way, that now it seems to me it would be very proper to turn in a different direction for a while to things which pertain to our everyday professional lives and to make our burdens lighter; and in that respect the essayists will enlighten us upon the topic under discussion tonight.

The gentlemen who are to read these essays are so well known that they need no introduction from me. I simply have the pleasure of presenting them to you. The first gentleman whose paper will be read is Dr. L. P. Haskell, of Chicago.

Dr. Haskell read his paper.

Dr. Haskell I am asked to explain how I attach teeth to aluminum plates. Always with rubber, and fasten it with the loop punch. Pink rubber will adhere better than other rubbers, but do not depend upon spurring a plate. I presume most of you have seen the loop punch. I put one row, eight loops, around the margin of the plate and eight more around the ridge. It does not change the shape of the plate in the least. Advise your patients that the aluminum plate is infinitely better than a rubber plate, and you will have more satisfaction in putting in a set of teeth.

Dr. Ramsdell. What thickness of aluminum plate does the Doctor use?

Dr. Haskell. Twenty gauge. You must have it thick enough so it will not bend. I never anneal it, either. You want to get it as stiff as you can, and it swedges without annealing.



ITEMS OF INTEREST

Dr. Reitz.

Do you use moulding sand?

Dr. Haskell.

Yes; any good moulding sand. There is a preparation known as Calcar which dentists tell me is very good. It requires no moistening with oil or

with water.

Dr. Reitz.

What kind of an articulator do you use?

Dr. Haskell.

With regard to the articulation of teeth, I do use an articulator, but I do not depend upon it. I use it as a partial guide. I arrange the teeth with the patient in the chair. I cannot tell how they will look unless they are in the mouth.

Dr. Croscup.

Oftentimes in swedging an aluminum plate it will tear apart in the front of the mouth. Do you resolder that?

Dr. Haskell.

No, I throw it away.

Dr. Powers.

Do you use air chambers?

Dr. Haskell.

I make no use of air chambers whatever. Plates will hold in just as well, provided they do not rest upon the hard palate. It is not that it gives adhesion—putting this relief in. It does not give additional adhesion. I was requested first to give a talk upon suction. Is it suction, or is it adhesion? If you put an air chamber in the mouth the patient must suck the air out, otherwise it does not act. Put in a plate with a relief, and the patient has not to do anything at all. You press it up with your fingers and there is the adhesion.

Dr. N. C. Leonard, of Nashville, Tenn., then read his paper on the same subject.

Mr. President and Gentlemen:

Dr. Leonard.

The subject of the insertion of artificial dentures reminds me somewhat of the subject chosen by the young student when required to write an essay. Not wishing to run out of material he selected for his subject "The World and Its Contents."

As the subject of the insertion of artificial dentures is somewhat broad I have chosen only one phase of it.

Discussion.

I have very little to dispute with either of the essayists, as I know nothing derogatory of the methods and systems which have been mentioned. Of course, there are one or two points on which I want to express myself. I think Dr. Haskell forgets that we have a "commencement" at the college. When the students finish their term with us we call it a "com-

SOCIETY DISCUSSIONS

mencement" and not a "finish," and we do not expect to turn out finished operators or dentists. Nothing but experience will teach them what they must know. We try to give them everything we can in the time they are with us, and we can do nothing more than that. We try to educate the student's fingers and his head, and when we have accomplished that we think we have done pretty well; but we cannot complete the education of either. If he intends to work in prosthetic dentistry or operative dentistry he must begin to study, to look, to observe, to take note. That is the only way a man can be taught—by experience. We cannot turn out men fitted to practice dentistry by the experience we older men have had, expecting them to begin where we are leaving off.

Weighty Lower Dentures Recommended.

Fifty years' experience is a good deal; forty years' experience is considerable—and it is strange that we all do not agree on every point when we meet together after having practiced for forty or fifty years. Consequently, I am going to say one of the very points that I differ on with Dr. Haskell is in reference to weighty dentures, as I must say they have helped me out of more difficulties than anything else I ever had to do. I have had patients come to me who have had plate after plate made for the lower jaw, and I myself have tried other plates for them without success; but when I have cast a metal plate, made rubber attachments to it and put it in the mouth I have given absolute satisfaction to the patient, to myself and to all concerned. I can name a number of them just in that condition. While, as the Doctor says, there are some mouths in which if you put a weighted plate it would flop from one side to the other those are the exceptions to the general rule. Very few patients can stand any pressure on the outer ridge, and if there is any pressure we must go over the other ridge, too. The cheeks help to hold it I think, and we can get over many difficulties in that way. I do not know any other point in this paper of Dr. Haskell's where I differ with him. It is very concise, and as to his method of relief in the mouth—of making a graduated chamber, as I call it—in many cases it is of great value to the patient. Sometimes you have a movable ridge that you cannot compress, but you can move it. When you put pressure on it it will move, and sometimes those chambers give you great relief in a flat ridge.

Atmospheric Pressure.

As to Dr. Leonard's paper, I must say his theory is one I have been preaching for a number of years. I do not believe that the plate is retained in the mouth by means of atmospheric pressure at all for any length of time. If that air chamber does not fill up it is inactive. You might as well say you can put a dry cup on your face, pull it out



ITEMS OF INTEREST

and say it would not fill out. You might as well say it is not the suck up, but the press down, that fills that chamber every time. Where there are inaccuracies in a plate that might not have been accurately adapted it might hold long enough to let the rest of the plate that did not fit come down and hold there. If you have the edges so sharp that that tissue cannot be drawn into it you will have a rupture of the membrane, and, as many of you have seen, the roof of the mouth all corrugated and looking like a raspberry—all red. You see it every day with plates put in with large air chambers. There is no argument on it. If they do not fill up by drawing it in they fill it by hypertrophy afterward.

Dr. Hillyer.

I would like to ask Dr. Littig to tell us about his attachments with aluminum.

Dr. Littig.

In using aluminum before casting the plate I take a bit of wax and swedge the plate with that bit of wax on it; then I file notches on it, fill it up with wax and let the attachment take place there, turning it up all around. I am glad Dr. Haskell has found an aluminum that acts differently from every one I ever used. They blister, and under the blister I find a white powder. I have found that to be the case in a number of plates that have been worn for a long time.

**Dr. R. M. Sanger,
of Orange.**

I would have liked an opportunity to study these papers thoroughly before attempting to discuss them, but my knowledge of them is almost as limited as your own. I made one or two notes, which may possibly be of interest. There seems to be a tendency extant on the part of essayists to get out their little hammers and have a rap at the teaching fraternity. This seems to be one of the hobbies of the age, and we accept it for more than it is worth, usually. In the *ITEMS OF INTEREST* for this month Dr. Hungerford gives a very able article on dental education in which he says, among other things: "Even among those who are earnestly trying to teach the result generally is an exploitation of individual methods and special formulas, rather than an inculcating of the broad fundamental principles which underlie all mechanical and physiological processes, etc."

Dr. Haskell says tonight the student is oftentimes confused with many methods; that the instructor should confine himself to a well-established and simple method of his own, which he knows produces satisfactory results. Here, gentlemen, we have the alpha and omega—the two extremes; and if they should seek to be guided by the erstwhile essayists they would soon be in the position of that old fable of the man, the boy and the jackass, where they would find themselves hopelessly submerged.

SOCIETY DISCUSSIONS

Now the fact is that the teaching profession, as is illustrated in the Pedagogic Society's meetings, is endeavoring to develop fully both the why and the how. Dr. Littig has truly said we do not and cannot turn out finished dentists. At the end of the scholastic year it is true we claim to have only a "commencement," and this fact must not be lost sight of when we speak of the material the colleges are producing. We hear men say that twenty years ago the product of the college and the man who entered the dental profession was a better dentist than he is today. Let us stop and consider what the facts are, and see how easy it is to form faulty judgment. Twenty years ago the colleges turned out about eight hundred graduates. Last year the colleges of this country turned out over forty-five hundred graduates. Is it strange that among forty-five hundred graduates there should be more failures than among eight hundred? Have you weighed carefully in your mind the fact that you are drawing from a larger number, and that the failures which you see are the exceptions and not the rule? This is just a little preface, as Dr. Haskell's remarks were, to the questions that are before us.

Vulcanite.

Dr. Haskell gives a very timely warning in regard to vulcanite plates. With the advent of vulcanite the pendulum began to swing back from the all-gold plate, past the center and to the extreme on the other side, until a few years ago we found men looking upon all-gold plates and metal plates and their makers as belonging to the old school.

Dr. Haskell tells you the vegetable base is too often a delusion and a snare. Because it is easy to work prosthodontia has suffered; but it has a place, and Dr. Haskell has called a very timely notice to the fact that the ideal plate today—this side of the continuous gum plate—is the gold plate with rubber attachments, or the metal plate with rubber attachments; that we must come to a point where we recognize that rubber creates physiological changes which lead to great harm to the majority of our patients. When they buy a plate it is not like buying shoes, which wear at the most a year or two; but something which should last for years, and the best is none too good nor too expensive.

Dr. Haskell has shown you extreme cases as illustrations of the theory in regard to the attachment of plates to the gum, and his theory would seem to substantiate the able paper of Dr. Leonard. I wish I had time to discuss Dr. Leonard's paper in detail, for while it is cunningly devised and very able in its line it proves the fact that if you admit a man's premises he can prove anything, and I question whether Dr. Leonard wanted to carry to your mind that adhesion was the only thing which held a plate in place. The very illustrations he gave disprove his assertion. Take a well-fitting plate and unless you ask the patient to exhaust the air it will



ITEMS OF INTEREST

not stick as a rule. Either by asking them to exhaust the air or by forcing it out you must make a suction. That this is not the only means, is true; but it is true that both forces are brought into play, and without either one the other would prove a failure.

Dr. John H. Meyer,
of New York.

I am afraid I would do an injustice to the essayist, as well as to myself, to attempt to discuss a paper which I had no opportunity of reading previously; but I noted a few points in reference to what Dr. Haskell said. I am very sorry that he did not go ahead a little and tell us what he does previous to his taking the impressions.

**Taking the
Impression.**

The patient presents himself in my office; I prepare the mouth first before I take an impression, and do it in this way: If the folds on the mucous membrane run to the very edge of the alveolar process, if you make a plate to that edge, you cannot expect a good adhesion; so I take a knife and cut that soft tissue away. I stretch the cheek with the fingers and cut around there, taking away those soft folds. Sometimes you find the impression of a chamber in the mouth, and you want to look between the folds there. You will be surprised to find what there is in there. I have had some cases sent to me by the profession where they failed to make a plate adhere. The plate apparently was all right, but there was some trouble—it did not come up to expectations. Upon searching in those little folds which the chamber had produced I have sometimes found an opening to the extent of three-eighths of an inch. How they come there I do not know. The only explanation is when the first plate was made a chamber was inserted and the mucous membrane drawn down; another plate and another chamber, and so on, leaving a vacuum there. If you see such a mouth you must go to the roof of it, and in order to do that I dry them thoroughly and pack with gauze. I put the old plate back and leave it there, and when they come in again there is a nice opening there; then I pack with cotton and sandarac varnish, and then I take an impression. If the cavity is sharp and not of a great dimension I take tin-foil and make a chamber of that, because chamber material such as you buy in a dental depot is too hard and too stiff, so I use tin.

Dr. Ottolengui.

You do use air chambers?

Dr. Meyer.

Yes; I never do without one. While Dr. Haskell was speaking against the chamber one of his models was passed to me, which had wax on it. It is not a relief. I put a knife into it, and it is about the same thickness as metal chambers. We used to call them "blind" chambers.

SOCIETY DISCUSSIONS

They are very nice in certain shapes of mouths, and they do not irritate a mouth as the sharp chambers would do.

Swaging Plates. In the swaging of plates Dr. Haskell says he only requires one set of dies—the lead counterdie and Babbitt metal die. One set of dies in my hands would be an utter failure. It depends, of course, on the kind of plate I am swedging. If I use a gold plate I want at least three sets; if it is platinum I want two sets. Instead of using Babbitt metal I have a metal which I prefer, and that is bismuth and tin—one of bismuth and six of tin; with that you get a metal that gives exactly the counterpart of the model. I make the counter of lead. If you remelt lead it becomes hard, and you want a soft bed to lie in. In order to swage the plate, and I will show you how necessary it is to have more than one set—it should be worked thoroughly into every crevice with a horn or copper driver. A horn or copper driver—a small one—perhaps one-quarter or three-eighths of an inch in size, should force the metal into every crevice of that die.

Shrinkage. As to the shrinkage in materials spoken of, there is not a material used where there is no shrinkage or contraction. All plates contract—rubber, silver, gold—all swaged plates. The contraction takes place at the condyle only, and nowhere else, because there is the weakest point. The deeper the condyles the more the contraction. To overcome that in a gold plate, for instance, you can solder a wire from condyle to condyle on the palatine surface of the plate, and then invest it and solder your teeth on with safety and it cannot contract; so with continuous gum. Continuous gum will contract more on those points because the body contracts if not properly packed. Then a platinum wire should be soldered from condyle to condyle. In a continuous gum case, where the condyle is extremely deep, I do not cover with porcelain at all. I put that on the palatine surface on the part that touches the roof. The Doctor spoke about lower plates, and says he has no trouble with lower plates. That is the only trouble I have—lower plates.

Dr. Haskell. The gentleman is mistaken. I said I told patients if I had no more trouble with lower plates than with upper ones I would be supremely happy, but that the lower plate is the bane of the dentist's life.

Dr. Meyer. Then I misunderstood him. I can show you patients who wear dentures which if you held them in your hand you would say it was not possible for a patient to wear—so heavy are they. I cannot get enough weight in lower plates. I have gone so far as casting the entire thing out of metal to get the weight, and I have been very successful with it.



ITEMS OF INTEREST

In reference to lower plates, where the mouth is shallow I often put air chambers in them. In lower plates in shallow mouths I put little blocks of wax around the ridge and I cast over that or swedge over that, and put that in the mouth, and in two weeks' time I find little bunches raised in the mouth and that helps my plate.

We have had beautifully expounded to us by Dr. Leonard principles involved in the retention of dentures. The principles are unanswerable. Any of us who have a knowledge of physics know we cannot controvert the arguments of the essayist. Their application to general practice, however, has not led me to the success which I had expected. It is more than five years now since I became converted to the theory of adhesion—to the theory that a vacuum chamber is not necessary—and I have been more and more successful in using plates without a vacuum chamber. Nevertheless, I am constantly meeting cases where I am compelled to use a vacuum chamber, and I want that explained. When I say that, I have gone to the trouble to thoroughly test the question in my own hands. If it is a fact that the vacuum chamber brings success to 90 per cent. of dentists and 10 per cent. can get along without it, it is the duty of those gentlemen who are on the 10 per cent. side to teach the majority.

I have made dies with and without the chamber. I have made one on the relief plan, or without any relief, according to whether the mouth was soft or hard, and I have made the other kind, with the chamber. In an even number of times I have been compelled, in justice to my patient, to use the one with the chamber in it. I want that explained.

I have a case in point, where I made a plate with a chamber for a lady. She used that five or six years. She came in for repairs and to replace teeth which had been lost, and all the while was staying up, as far as the suction was concerned. I made her a new plate on the relief plan, and it was just about as useful to her as it would have been on her feet so far as staying in place was concerned. The same plate swaged on a die with a chamber succeeded. Now, why is it?

Dr. Haskell misconceives us in the East. He brings us a number of flat roofs and tells us they are hard to do, and explains how he succeeds. I think they are easy. When you have a high roof there is trouble.

I want to say a word in relation to the common assertion that if a suction plate is used the roof of the mouth will be drawn into it. How do you make your suction? You pour a model and add a piece of metal to it. My teaching was from Dr. Kingsley,

and Dr. Kingsley was a man of considerable experience you will all admit. Like Dr. Meyer, he told me that he never made a plate without a suction

**Air Chambers
not Necessarily
Injurious.**

SOCIETY DISCUSSIONS

chamber that he did not have to throw it away and make the other kind. His suction chambers do not draw the mouth, either. I am not speaking of flat mouths. I admit you need none there; I am speaking of high vaults. He takes a knife and simply removes the highest portion of the model of that mouth, and, in addition to that, cuts the chamber into that impression. When you pour your model you have one which looks like the usual model, but which is three times as far from the true dome of the mouth as it would be if you had poured your model and added a metal chamber form. The tissues are never drawn down to fill a chamber made in that manner.

**Restoring Mouth
Injured by
Air Chambers.**

I will relate to you some teaching I had from Dr. Atkinson years ago which is very valuable. When the roof of the mouth had been ruined by having the tissues drawn down Dr. Atkinson made a rubber plate to accurately fit the parts. The hypertrophied parts were painted with a saturate solution of salicylic acid in alcohol. That was done once daily for three or four days; then some plaster put in the plate, and the plate put in the mouth. That was continued from time to time, the plaster cores being changed at each setting, increasing in thickness, until the roof of the mouth was gradually reduced to its proper condition. I remember one case he showed me where he had reduced nearly half an inch of hypertrophied tissue by that means in the course of a few weeks.

Dr. Haskell.

Gentlemen, you are getting me into close quarters. I have oftentimes thought in meetings of dental societies, when two individuals of wide experience differ so greatly in their methods, what can be the effect upon the minds of young men just coming into practice? It reminds me of the darky at the camp meeting. Said the minister: "Brethren, this road leads to hell and that one to damnation." The darky answered: "If that be the case this nigger takes to the woods."

In regard to the questions that Dr. Ottolengui has asked me, I have been confining my experience for fifty-nine years to putting in artificial dentures, and I am simply speaking of the success I have had. I used air chambers for thirty years in every plate I put in, metal or rubber. My preceptor was my brother-in-law, who began practice about two years before I went to him. At that time plates were held in by spiral springs. They are still used in Europe a good deal. The idea came to him of atmospheric pressure. In those days impressions were taken almost entirely in wax. I think he was one of the first to use plaster for impressions, and he used the common plaster, not the refined. Then he used tin dies.



ITEMS OF INTEREST

He had a patient, an old gentleman, who had quite a flat jaw. This was before I went with him. He took his impression, made his tin dies, swaged his plate and placed it in the mouth. In those days there was no change made in models, no air chambers and no reliefs. The plate was fitted to the jaw, and that was the procedure until the Gilbert air chamber came into use. My brother-in-law placed this in the mouth, and was surprised how it adhered. He soldered a loop to the center of the palate, attached a long cord to that, took an ordinary water pail, filled it with water and tied the other end of the cord to it, had the old gentleman suck up the plate and made him hold up that pail of water. Now was that suction or adhesion?

With regard to dies, if I can successfully fit a plate—gold, platinum or aluminum—with a single die, why under heaven do I want to make three dies? As long as I know I make a success of it, what is the use of making more dies?

In regard to this matter of air chambers: If the vacuum method is used, what is the result? In a short time the alveolar process will be giving way to some extent. If no provision is made for that, what is the result? The anterior and posterior parts are resting on that hard part, and you have a rocking there. For more than thirty years I have abandoned air chambers. I have relied entirely upon this relief in all the conditions I speak of.

In regard to what Dr. Ottolengui asks me, I want to call his attention to two things: I held up two models; one represented 98 per cent. of mouths where the relief was needed, and the other 2 per cent. where it was not. I get the same results as far as adhesion is concerned. It is not necessary to have that adhesion that you can hardly pull it out of the mouth. I have found all these years perfect success with the relief.

Dr. Ottolengui.

What about high vaults?

Dr. Haskell.

I pursue the same course there. I do not put in any relief at all there—or sometimes a very slight one. The first thing after swaging the plate I try it in the mouth. I press it up with my fingers, and where it is not favorable to adhesion I do not find that adhesion by pressing the plate up. I want to make sure of one thing—that there is no air getting there. With a pumping process I watch for air bubbles. If I see them I know it does not come up close enough. If I do not see any I give myself no concern about air chambers. I go ahead and finish it up, and feel sure that after it has been in the mouth a short time there will be enough adhesion. I am speaking of facts in my own experience.

SOCIETY DISCUSSIONS

In regard to removing the soft ridge, if I could induce patients to do it they would be better off, but the trouble is to get them to do it. Inject a little cocaine, and it is easily removed and no pain; but they dread a surgical operation and will not have it done. If you can induce the patient to have it done, do it by all means.

The blister in aluminum is sometimes the same as you find in a gold plate. When you heat it it blisters. Why? Because in the melting of the plate there was an air bubble. When you roll it it looks all right, but when you heat it there is a blister. A dentist in Maine told me last year that there was one thing he could not account for. He sent a plate to me and there were blisters all over, just the same as I have seen in gold plates. It was simply a bad piece of aluminum.

With regard to the weight of the lower plate. For many years I used these weighted plates, but now I know the weight is not necessary. You have seen rubber plates worn a number of years that gradually slide forward, and you must grind the anterior teeth so they will not slide.

With regard to closure of the teeth that is a great mistake. Of course, you must use your judgment in the matter of placing the teeth on the plate. I have seen many sets of teeth where there has been excessive absorption, and the dentist thought he must set the teeth way in on the margin of the jaw—no room for the tongue at all. I deny that it is necessary. I always arrange the teeth as nearly as Nature arranged them. I do not set them as far out, where there is that excessive absorption, but I try to equalize the pressure. I have not in my own practice found it necessary to contract the teeth and bring them in over the ridge. The breaking of plates is not owing to that entirely; it is due to other causes.

I appreciate very much the consideration that
Dr. Leonard. has been shown and the reception that has been given my paper. I will undertake to answer briefly some of the questions that have been asked and some of the criticisms that have been made.

First, in regard to the suggestion by Dr. Sanger, what my claim was that adhesion was the only force by which the denture was retained. I did not say that, because I know there are other forces that assist in retention of the plate. For instance, the muscles of the mouth may be made to sustain a considerable part of the weight of the plate and to resist a good deal of the force that tends to dislodge it. This fact is frequently taken advantage of by all men who make plates, I presume.

In regard to the vacuum chamber and the failures that have been made, as suggested by Dr. Ottolengui, where the vacuum chamber has not been used and good results have been had with the use of the





ITEMS OF INTEREST

vacuum chamber it is difficult to explain individual cases without knowing all of the conditions. The bad results gotten in the plate where the air chamber was not used may have been due to some of the changes that take place in the materials used during the operation. There may have been some little shrinkage or warpage of the plate that might account for that. It may have impinged upon the hard areas of the mouth in such a way that you did not secure good contact. I think the correct way to begin a work is to understand the principles which it involves; that is, the principle on which it is to be founded. If we begin to reason from facts we can build up a practice that will be more accurate and more valuable, and from which we get better results than if we base our operations upon false premises. I have undertaken to eliminate some of the teaching that is obviously false in this matter. These things—a great many of them—are believed by students and are taken as facts; and if the student begins to base his operations upon false premises, then the probabilities are that he will get very poor results. The fact that it has been taught and is being taught in the dental schools, or many of them, that because the atmospheric pressure is excluded from the under side of the plate, its force is only manifested on the lingual surface of the plate, would indicate the necessity of some expression from the dental profession which would eliminate this teaching. It would indicate that, because of the teaching the student (if there were no others who believed in this theory) is basing his operations upon a false theory. This and other things that have been suggested in my essay are the reasons I have for presenting this matter—simply because I think one of the learned professions should eliminate as far as possible all errors from its teaching. We should be scientific if possible. If I have not presented these questions fairly I am open to conviction. I would like to have the matter pointed out to me where I have failed to present them fairly, and if I have made a mistake in their presentation I would be very glad to have any gentleman point out the errors to me through the journals or any other way, and settle once for all this question which seems to have given the dental profession a great deal of trouble, and about which there has been a great deal of misunderstanding.

Dr. Hillyear moved a hearty vote of thanks to Dr. Haskell and Dr. Leonard for their able papers, the same being unanimously carried.

Adjournment.

Institute of Dental Pedagogics.

Discussion of Dr. Stubblefield's Paper, 'An Ideal in Pathology.'*

Dr. O. L. Hertig,
Pittsburg, Pa.

It is with considerable embarrassment that I attempt to impress my feeble efforts upon this august body in regard to a field so vast and so impenetrable as pathology. One thing that impressed me on arriving at this meeting was the reason of our being here. One gentleman said we are here because we are teachers, and that we want to show that we are teachers. Another gentleman said that we are here as teachers with a small t, and as Students with a big S. The very existence of this institute is evidence that there is a weak spot somewhere in the teaching ability of the teachers of this country. We are here to exchange experiences; to learn and to profit. I am only a beginner in this field, but as much as I ever may know it still will be but little compared with what there is to learn. We are here to learn to teach; and one of the greatest missions of man is to teach those who know less than he does.

Why is it that we have such intolerably stupid material to deal with in our schools? Everybody says that the boys cannot think, and that you insult them when you try to stimulate their thinking apparatus. This is true to a certain extent only, because among the students you encounter some who have a decided capacity for clear and intelligent thinking—a capacity that often is lacking in more highly educated men. Why is it, then, that we have this stupid material to deal with? Ask yourselves. We are all teachers interested in similar institutions of learning, and we know that because the dental colleges receive such material is the reason why they are complaining about the lack of appreciation and the stupidity of their classes.

The remedy is plain. You all know it; I need not say what it is. With a class of men who have been taught to think from boyhood up; with a teacher aflame with an ideal as described by the essayist, then may we expect ideal results. In no field are these results more to be wished for than in the field of dental pathology. Ideals are delicious things to contemplate. We look forward to, and we strive for, and try to emulate an ideal. What is an ideal? The formulation of a thought in the man's mind of what he would like to do or be. Something that he conceives as being near perfection, and his idea of perfection exists only in the branch about which he is thinking. Therefore, there cannot be a definite mental picture without some practical experience in that branch.

Take inflammation. It is a long word and a big subject, and while

*Dr. Stubblefield's paper, "An Ideal in Pathology," will be found in the April issue of *ITEMS OF INTEREST*, page 274.



ITEMS OF INTEREST

the essayist says that all diseases are inflammations, yet there is some doubt about it. If we should stand before our classes and make such a statement some inquiring mind would ask if we still adhere to the inflammatory theory of dental caries. Dental caries is a disease just as surely as is diphtheria.

Simplicity and clearness in expounding is the ideal toward which we should aim in presenting a subject to our classes. Simplicity and clearness and the use of plenty of good common sense. One definite idea is worth a lot of mixed up stuff. That one idea means a clear, concise presentation of the subject, and while I do not agree with the Doctor in his theory regarding inflammation, yet his idea with reference to formulating something for his class is praiseworthy.

It has been a great problem with me as to how we can stimulate the students to think independently. I know that the occupant of every chair, no matter in what branch or subject, has the desire to create the impression on his class that all knowledge coming from that chair has emanated from the individual occupying it. This is true of all teachers, both in dental and medical colleges. Yet they are simply teaching what they have learned from books plus their own experiences in actual practice. After you have talked to a body of students for an hour on some subject, perhaps abstruse, you will notice that here and there one is going to sleep. He is not interested; he cannot comprehend, and his mental inertness makes him drowsy and dull.

How do our teachers of grammar, geography and arithmetic instil knowledge? How do the literary colleges do it? Does the teacher go before his class and lecture, and let the boys get just what they can? No. He has a text-book on every branch he teaches, and he assigns a lesson from which he will interrogate, and which he will enlarge upon and explain. And thus, by leading the student mind into the proper channel, the habit of thinking is inculcated and good results are obtained.

The paper is excellent, but it does not contain much about teaching pathology. The essayist stated that every disease, no matter what its cause, is an inflammation; that pathology is only a discussion of inflammation. I cannot agree with that for a moment because there are many diseases that are not the result of inflammation, and other diseases in which inflammation is only a symptom. The man who teaches that pathology is inflammation is doing a great wrong to his students. And, as Dr. Hertig said, inflammation does not exist in caries of the teeth. To say that inflammation is pathology and that pathology is inflammation is wrong. There is not the least analogy between a general fever and inflammation, and yet the essayist draws one.

Dr. Geo. E. Hunt,
Indianapolis, Ind.

SOCIETY DISCUSSIONS

Let us run over the pathology of inflammation. The first thing that occurs is dilatation of the blood vessels with increased rapidity of flow in the capillaries. The irritation relaxes the vasomotor nervous system and allows the arteriole walls to dilate, thus bringing more blood to the part. The same cause results in dilatation of the vein walls, and the fact that more blood is brought to the part by the arterioles necessitates an increase of speed in the undilated capillaries. Does that occur in a general fever? Not at all. If all the veins and arteries dilated there would be no circulation of blood in the body at all. It would stagnate in the blood vessels of the body. Later there is an exudation from the blood vessels beginning in the smaller veins. The leucocytes collect on the inside of the vessel wall and finally make their way into the tissues. Does that occur in a general fever? No. There is no analogy between an inflammation and a fever, except that in the early stages of each there is an increase in the nutritive changes occurring in the part affected. But in the later stages of inflammation there is a diminishment, almost a suspension, of nutritive changes, resulting in coldness instead of heat. I think the man who attempts to teach pathology on the basis that it is inflammation and that inflammation is pathology is doing his students an injustice.

I regret that more was not said about the methods of teaching pathology. That is what I want to learn, because I teach pathology. "I have fought, bled and died for the subject of pathology before this association for many years, and our late lamented friend, Dr. Barrett, assisted in laying out my remains at Chicago last year on this same topic. I have a course in general pathology so that when I take up the subject of pulp conservation I do not attempt to teach inflammation. The student is supposed to have learned that before. In fact, he cannot understand the subject of pulp destruction until he has learned all about inflammation.

The teacher of pathology needs to have a clean-cut idea of the subject; what it is, what it is caused by and what it leads up to in the end. Pathology is made up of a set of symptoms following upon something. The principal points in pathology with which we meet in operative dentistry, if I should speak of it in that way, only including a part of it, begins for the most part with the pathology of caries, with an injury produced, which as a sequence brings finally an injury to the pulp of the tooth. We have an infection and an inflammation, possibly a suppuration, that extends to the apical end of the root of the tooth. And then alveolar abscess and all the sequences that may come from that whose origin can be traced to the primary caries. We can trace the conditions from one to the other, and in this way arrive at a clear concep-

Dr. G. U. Black,
Chicago.



ITEMS OF INTEREST

tion of the course that has been run and the existing conditions, and be ready to apply the proper remedy. We cannot teach pathology by any course of reasoning except by following these sequences step by step as they occur, thus gaining a history of the whole condition from its incipency.

For instance: A few days ago a student came to me and said that he was not quite satisfied with a certain case. There is a swelling, supposedly an alveolar abscess, yet it did not present the usual evidences of abscess. I asked what were the conditions, the history of the case. "There are the molar teeth perfectly sound," said he, "and yet there is a swelling about the roots of one of them." I said, "Look further." There was one tooth missing. An exploration was demanded. It was made and the missing tooth was found below the roots of the other teeth. Here is an entirely different set of conditions. There was no alveolar abscess. By following up the conditions that presented themselves in the order indicated, by getting at the sequence of the trouble, we had no difficulty in arriving at a complete understanding of the case and the treatment was evident. That is pathology; having in mind the possibilities that may result or follow from a primary injury and in that way solving the problem.

Pathology is a pleasant subject to teach. In fact, no subject in the curriculum of our colleges today can be made more intensely interesting to the average student than pathology. No subject in the curriculum affords so wide and varied a field from which to draw illustration, and all of us know that no better method of teaching exists than that by which the teacher clinches the idea he has presented in the mind than by pointing out clear-cut analogies. For instance, the wonderful work done by one of the two classes of leucocytes chiefly concerned in the inflammatory process is beautifully illustrated and amplified by a close study of the process of production of antitoxin now so successfully used in the treatment of diphtheria, and here let me say that I find students most keenly alive to this sort of illustration. Not only does the subject of inflammation take on more interest, but the subject of immunity, as wrought out by the leucocytes seizes for itself a place in the mind of the student that makes him an attentive listener, particularly when immunity comes up for discussion. I thoroughly agree with the essayist that it is most essential that the teacher should possess a clear-cut idea of the end to be attained. In fact, in order to teach pathology and make the subject vital, he must have a good general education in medicine and have served in the various capacities in the post-mortem room, the pathological laboratory and the general hospital; then only is he qualified with the illustrative material to make this subject interesting.

Dr. Thomas B. Hartzel,
Minneapolis.

The essayist has made several points very clear, the most salient of which is the fact that inflammation is the foundation on which all pathological knowledge rests; that all disease is the result of some variation of the inflammatory process. This being true, our first task is to lay this foundation, and how can we best do this? I answer, by carefully following the laboratory methods of George J. Adami as outlined by him in his chapter on inflammation, written for Clifford-Abbot's System of Medicine, a résumé of which can be found in The American Text Book of Pathology, edited by Hectoen. It is deeply to be regretted that there has not yet been published a text book on pathology for dental students that is sufficiently comprehensive, and that is one of the reasons for some of the complaints we hear in regard to this branch. However, let us be inspired by a firm belief in the absolute necessity for intelligent comprehension of pathology to successfully practice dentistry. Educate our teachers to this view of the case and the subject will never lack interest.

I see that I failed in transmitting the idea in my
Dr. Stubblefield. brain to the place where Dr. Hunt's brain ought to be, and I hope that he is not typical of the body that hears me. Now, Dr. Black presents the subject in a way that reminds me of a little game we used to play when children: You are cold or hot as you recede or approach. He says it is a sequence of changes, of structural changes; but dependent upon what? That was the idea I tried to present in my ideal. Please take the paper and digest it, and if it is not worth anything, why it is not the first effort that has proved futile and worthless. But I am going to keep on treating inflammation as the result of a cause, and the first essential rule is to remove that cause. The cause is either transitory or permanent. If permanent, its effects will be more or less permanent, and then you have this sequence of changes that Dr. Black detailed. If you remove the cause, resolution occurs. If the process goes beyond a certain point, nature cannot bring about resolution, and the changes continue until there is complete dissolution.

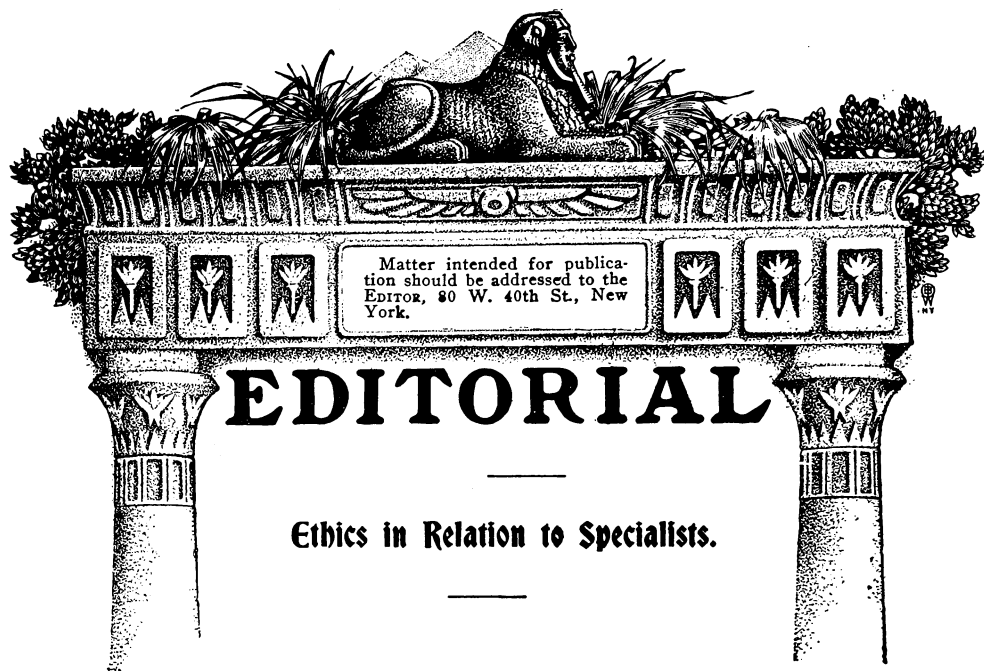
Dr. Hunt said that there is no analogy between a local inflammation and a general idiopathic fever. Does an analogy between two conditions depend on an exact conformation in all things? Cannot you conceive that the structure in which the inflammation occurs will modify the type of inflammation? I did not say that this ideal is perfect because it is an ideal. I told you that the ideal may be wrong, as well as the idea from which it sprung, but I still claim that they did not set up any objection to the acceptance of the ideal.

Dr. Hertig said he would be knocked down if he said that dental caries is an inflammation. What are the symptoms of inflammation? Pain, redness, heat, swelling and perverted function. Is a tooth perverted

ITEMS OF INTEREST

in its function when it has undergone the effect of an irritating cause in the way of caries? What do these patients come to us for unless to re-establish function? Does solution of continuity mean nothing? Is not the cause the irritation present, but because it happens to be a hard structure the result does not show itself in the usual manner? We do not expect engorgement of capillaries in a tooth, but essentially the cardinal symptoms are present in a modified form that is due to their environment.





A correspondent of the *Dental Review* raises the question "Is it ethical for a dentist to announce a specialty on his business card?" and advances the argument that the code forbids calling attention to special kinds of work. The editor of the *Dental Review* very properly takes the ground that the code does not mean a special branch of dental work, but rather work which the dentist might claim to be special with himself, as for example the commonly seen advertisement that the advertiser has discovered a method of making dental operations painless. But the editor of the *Dental Review* goes on to say that it is questionable whether one should announce a specialty on cards and stationery while still in general practice, and then invites discussion. We might go further than the editor of the *Dental Review*, and say at once, that it is equally questionable to announce on cards and stationery that one is a dentist. Why should cards or stationery carry anything besides the name and address? Manifestly to announce (which is to advertise) one's calling. If the correspondent of the *Review* thinks it ethical, to announce (or advertise) on a "business" card that one is a dentist, why should he think it wrong to announce (or advertise) that one is a dentist, giving special attention to orthodontia, prosthodontia, or any other branch?

ITEMS OF INTEREST

Limits of Ethical Advertising.

To frankly call things by their names, even the code permits a certain amount of advertising, and the whole question turns on the limitations thereof. It would require too much space to examine the codes of all the societies, and give their varying interpretation; suffice it to say that some codes permit Society members to publish their names, addresses and business in the public prints. This is called publishing a "professional card," but the restriction is definitely stated, as above.

Let us consider the intent and spirit of the code, and the application of the rules will readily be discerned. Advertising is a fundamental necessity of commercial pursuits. The business man advertises his wares and his prices, and his advertisement is an attempt to convince the reader that it will be advantageous to purchase of, or deal with him. But no self respecting merchant invites patronage on the ground that he is cleverer, or in any way better than his competitor. In other words he advertises his goods, and not himself.

The advertising dentist, on the contrary, advertises his work; he advertises that which he does with his own hands (or with the hands of hired assistants, whom he vaunts usually as "specialists"), and therefore he advertises himself. Imagine a portrait or landscape painter advertising that he paints better or cheaper pictures than any other artist! Would he not bring contempt upon himself?

Do we find reputable ministers, lawyers or physicians filling columns of the newspaper with self laudation?

Why then should the code permit, even the faintest semblance of advertising? Because, after all, dentistry in a way is a business. The code, therefore, permits one to announce, on cards and stationery the nature of one's business. The dentist may state that he is a dentist; he may add that he is a specialist; he may give his address; he may print his office hours. Note that nothing in this lauds himself or his work. A card should not, however, carry a scale of prices on the back. This is undignified if not actually unethical.

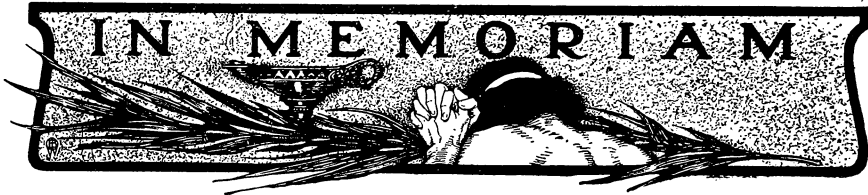
If one desires his ethics to be above reproach, his card should read simply "A. B. See, D. D.S., No. 10 Fifth Ave." with office hours in one corner if desired.



Corrections.

In the April number of *ITEMS OF INTEREST* an error was made in announcing the State Committeemen of the Congress, Massachusetts and Michigan having been mixed. The chairman of the Committee from Massachusetts is Dr. M. C. Smith, 3 Lee Hall, Lynn, and the chairman from Michigan is Dr. G. S. Shattuck, 539 Fourth Avenue, Detroit.

By an error in the May number the paper read by Dr. Park Lewis was credited as having been read before the Institute of Dental Pedagogy, whereas it was a contribution to the American Society of Orthodontists.



Dr. Edgar D. Swain.

Resolution Passed by Chicago Dental Society.

The Chicago Dental Society now in session offers this expression of our grief at the sudden death of Dr. Edgar D. Swain.

For more than thirty years he was one of the group of honored and trusted men who conducted the affairs of this Society and the State Society. He performed every service and received every honor that these societies could ask or confer upon him, and his name was seldom absent from the list of officers or important committees.

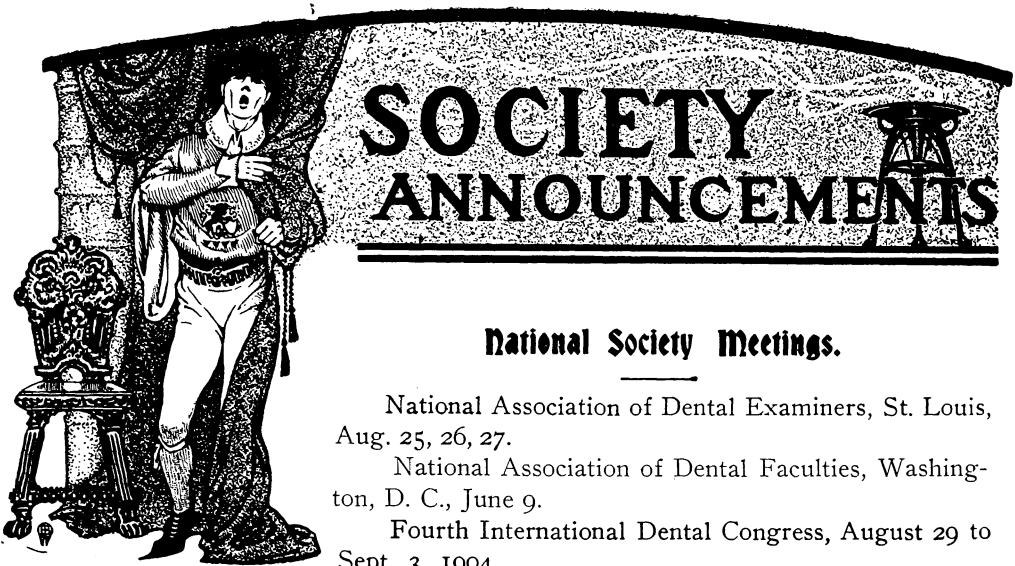
His strong, sincere and positive nature won for him, far more than is usual, the respect and honor of all who knew him and the warm affection of those who were nearest to him. These qualities and a generous disposition made him especially a friend and helper of worthy young men. No one ever heard him speak a harsh or unkind word to any one, unless for some act of meanness or sordidness.

This Society, the State Society and the dental profession of Illinois owe him a large debt of gratitude, and his memory will long be cherished among us. Those who knew him well will never cease to miss his presence and to mourn his loss.

Resolved, That the above be placed upon the records of this Society and copies be sent to his family and to the dental journals.

EDMUND NOYES,
J. S. REID,
GEO. J. DENNIS.





SOCIETY ANNOUNCEMENTS

National Society Meetings.

National Association of Dental Examiners, St. Louis,
Aug. 25, 26, 27.

National Association of Dental Faculties, Washing-
ton, D. C., June 9.

Fourth International Dental Congress, August 29 to
Sept. 3, 1904.

State Society Meetings.

Delaware State Dental Society, Oct. 5.

Georgia State Dental Society, Athens, June 28.

Indiana State Dental Association, Indianapolis, June 14, 15, 16.

Maine Dental Society, Bangor, July 19, 20, 21.

Massachusetts Dental Society, Boston, June 1, 2.

Michigan Dental Association, Lansing, June 28-29.

Minnesota State Dental Association, St. Paul, June 16, 17, 18.

Montana State Dental Society, Butte, Feb. 20-21, 1905.

New Jersey State Dental Society, Asbury Park, July 21, 22, 23.

North Carolina Dental Society, Morehead City, June 22-25.

Pennsylvania State Dental Society, Wilkesbarre, July 12, 13, 14.

South Carolina State Dental Society, White Stone, July 19-22.

Wisconsin State Dental Society, July 19-21.

Massachusetts Dental Society.

The fortieth annual meeting of the Massachusetts Dental Society will
be held in Massachusetts Charitable Mechanics' Association Building,
Huntington Avenue, Boston, June 1 and 2, 1904.

Cambridge, Mass.

E. O. KINSMAN, Secretary.



Programme of the American Medical Association.

Section on Stomatology.

Dental Education:

1. The Value of Symmetry in the Development of Professional Character and Education (Chairman's address).
GEORGE F. EAMES, Boston, Mass.
2. The Evolution of Standards in Dental Education.
CHARLES CHITTENDEN, Madison, Wis.
3. Phases of Dental Education.
A. E. BALDWIN, Chicago, Ill.
4. Dental Education (A Retrospective and Prospective View).
JOHN S. MARSHALL, San Francisco, Cal.

The Dental Pulp:

5. Neoplasm of the Tooth Pulp.
VIDA A. LATHAM, Chicago, Ill.
6. Vital Principles in Adult Pulp.
R. R. ANDREWS, Cambridge, Mass.
7. Degeneration of the Tooth Pulp.
EUGENE S. TALBOT, Chicago, Ill.
8. The Pulp
JOS. ARKOVY, Budapest, Hungary.
9. A System for Surgical Treatment of Hare-lip, Cleft Palate and Facial Deformities and Post-Operative Speech Education.
GEORGE V. I. BROWN, Milwaukee, Wis.
10. Multiple Fracture of Lower Jaw Complicated by Simultaneous Fracture of the Upper Jaw.
THOMAS L. GILMER, Chicago, Ill.
11. Impacted Teeth, Their Diagnosis, Liberation and Extraction.
MATTHEW H. CRYER, Philadelphia, Penn.
12. Anchylosis of the Jaw.
G. LENOX CURTIS, New York City, N. Y.
13. Necrosis of the Bones of the Face.
STEWART L. MCCURDY, Philadelphia, Penn.
14. Treatment of Pathological Irregularities of the Teeth.
M. H. FLETCHER, Cincinnati, Ohio.
15. Report of a Case of Vincent's Angina and Stomatitis, with Photographs.
GEORGE C. CRANDALL, St. Louis, Mo.
16. Oral Infection and Sterilization.
M. L. RHEIN, New York City, N. Y.



ITEMS OF INTEREST

17. Concerning Changes in the Salivary Secretions as affected by Systemic Disease. HEINRICH STERN, New York City, N. Y.
WILLIAM LEDERER, New York City, N. Y.
18. Prophylaxis in Relation to Tooth Environment and to the Prophylactic Value of Materials Employed.
CHAS. F. ALLAN, Newburg, N. Y.
19. The Physician's Duty to the Child from a Dental Standpoint.
ALICE M. STEEVES, Boston, Mass.
20. Ethics.
ADELBERT H. PECK, Chicago, Ill.
Dr. GEORGE F. EAMES, Chairman.
EUGENE S. TALBOT, Secretary.

New Jersey State Dental Society.

The thirty-fourth annual session of the New Jersey State Dental Society will convene in the Auditorium, Asbury Park, N. J., 10 a. m., Wednesday, July 21, and continue in session Thursday and Friday. Asbury Park is one of the great Atlantic Coast watering places contiguous to New York and Philadelphia. The Auditorium will hold 3,000 people, and is open on every side. Fifty clinics will be given by men from North, South, East and West most eminent in their profession, and will include the newest advances in all that pertains to operative and mechanical dentistry. In the exhibits the Society feels that the latest and largest number of adjuncts to the successful practice of modern dentistry will repay a visit and inspection. The essays will consist of five already accepted and the best obtainable.

The social members and the visiting friends will be as usual provided for, and on Thursday evening at 10:30 a smoker will be conducted. The Columbia Hotel will be headquarters, with rates of \$2.50 to \$3 per day. Those desiring rooms must send in notice by July 1. The programme as usual will be replete with information.

CHARLES A. MEEKER, D.D.S., Sec'y.

29 Fulton Street, Newark, N. J.

Georgia State Dental Society.

The next meeting of the Georgia State Dental Society will be held at the Commercial Hotel, Athens, Ga., on June 28, 1904.

Indiana Dental Association.

The Indiana Dental Association will meet at Indianapolis, on June 14, 15 and 16. A splendid programme is being prepared.

New Castle, Ind.

A. T. WHITE, Secretary.

North Carolina Dental Society.

The thirtieth annual meeting of the North Carolina Dental Society will be held at Morehead City from June 29 to July 2, inclusive.

Greensboro, N. C.

J. S. BETTS, Secretary.

Minnesota State Dental Association.

The twenty-first annual meeting of the Minnesota State Dental Association will be held in St. Paul, June 16, 17 and 18.

Lake City, Minn.

G. S. TODD, Secretary.



The thirty-ninth annual meeting of the Minnesota Dental Society will be held in Bangor, July 19, 20 and 21, 1904. All ethical dentists are cordially invited to attend, and we especially invite natives who are practicing out of the State to meet with us and make this a "home week." We expect men of national reputation to give clinics and read papers. Reduced rates will be given on transportation and at hotels.

Castine, Me. WILL S. PAYSON, Chairman Executive Committee.

Minnesota State Dental Association.

The twenty-first annual meeting of the Minnesota State Dental Association will be held in St. Paul on June 16, 17 and 18. Dr. Capon, of Philadelphia, will read an essay and clinic on inlays. Other essayists and clinicians have been selected from the best operators in the Northwest. All ethical dentists are invited to attend the meetings. Any further information will be cheerfully furnished by either of the undersigned.

GEO. S. TODD, Sec'y, Lake City, Minn.

J. O. WELLS, Chairman Executive Committee, Masonic Temple, Minneapolis, Minn.



South Carolina State Dental Society.

The thirty-fourth annual meeting of the South Carolina State Dental Society will be held at White Stone Lithia Springs, White Stone, S. C., July 19, 20, 21, 22. We anticipate a pleasant as well as a profitable meeting and a cordial invitation is extended to all.

Boston and Tufts Dental Alumni Association Thirty-Second Announcement.

Alumni Day will be observed Tuesday, June 14, 1904. The morning will be given up to clinics, exercises and social reunion at the school building 416-430 Huntington Avenue. The afternoon to an outing and banquet at the Paint Shirley Club by the Sea. Graduates and friends of the school are cordially invited. MARION L. WOODWARD, Rec. Sec'y.

2 Commonwealth Avenue, Boston, Mass.

Southern Wisconsin Dental Association.

The tenth annual meeting of the Southern Wisconsin Dental Association will meet in Beloit, Wis., on June 8 and 9. We anticipate a pleasant as well as a profitable meeting, and a cordial invitation is extended to all.

Clinton, Wis.

C. W. COLLOVER, Sec'y.

Delta Sigma Delta Fraternity, Supreme Chapter.

The twentieth annual meeting of the Supreme Chapter, Delta Sigma Delta Fraternity will be held Wednesday, August 31, 1904, at St. Louis, Mo. George E. Hunt, 131 East Ohio Street, Indianapolis, is Chairman of the Committee on Arrangements.

Michigan Dental Association.

The Michigan Dental Association will meet in Lansing June 28-29. The Programme Committee has arranged something that will be instructive in daily practice.

J. J. GREEN, Sec'y.

Ionia, Mich.





The Georgia State Dental Society.

The thirty-sixth annual meeting of the Georgia State Dental Society will be held in Athens, Ga., June 28, 29 and 30, 1904. Arrangements are being made to make this the greatest convention ever held in Georgia. All ethical practitioners are cordially invited.

A. M. JACKSON, President.
D. H. McNEILL, Cor. Sec'y.

Wisconsin State Dental Society.

The thirty-fourth annual meeting of the Wisconsin State Dental Society will be held in Manitowoc July 19-21, 1904. A cordial invitation is extended to all ethical practitioners to meet with us.

A. G. FEE, President.
W. H. MUELLER, Sec'y.

Madison, Wis.

Champaign County Dental Society.

The dentists of Champaign, Ill., have formed a dental society to be known as the Champaign County Dental Society. The following officers were elected: Dr. F. O. Sale, Urbana, President; Dr. H. E. Davis, Vice-President; Dr. J. Addison Brown, Champaign, Secretary, and Dr. W. H. Boon, Champaign, Treasurer.

Pennsylvania State Dental Society.

The thirty-sixth annual meeting of the Society will be held at the Hotel Sterling, Wilkesbarre, Pa., on Tuesday, Wednesday and Thursday, July 12, 13 and 14. The convention will be called to order at 10 a. m., Tuesday, July 12. Every effort has been made to make this the most interesting and useful meeting of our Society. The Executive Committee promises a very full programme, including among its essayists Dr. B. Holly Smith, of Baltimore; Dr. M. H. Cryer and Dr. E. C. Kirk, of Philadelphia; Dr. Gordon White, of Nashville, and Dr. Anema, of the Netherlands. Besides these a number of prominent clinicians demon-



SOCIETY ANNOUNCEMENTS

strating some specialty in dentistry have volunteered to give their time and skill for the good of the profession and to make this meeting a successful one. All reputable men of the profession are cordially invited to attend.

G. W. CUPIT, Sec'y.

1420 Chestnut Street, Philadelphia, Pa.

The National Association of Dental Examiners.

The National Association of Dental Examiners will hold their annual meeting in the Coliseum Building, corner Thirteenth and Olive Streets, St. Louis, Mo., on the 25th, 26th and 27th of August, beginning promptly at 10 a. m. Telephone and telegraph offices in the building.

The committee on railroad accommodations for the East have made arrangements for fast through Pullman service to St. Louis from New York with the Delaware & Lackawanna Railroad. Two special Pullman cars will leave New York Tuesday, August 23d, at 10 a. m. The cost of our excursion, including berth each way, will be \$35.50. A proportionate reduction is made for those going from Buffalo, Toledo, Fort Wayne and cities on the line connecting with the Wabash Railroad. Those who desire to go in the special train should send notice as promptly as possible to Charles A. Meeker, D. D. S., Secretary of the National Association or to Guy Adams, general passenger agent of the Delaware & Lackawanna Railroad.

Accommodations have been secured for the National Association of Dental Examiners at the Franklin Hotel, Northwest corner of Sarah and Westminster Place, with rates from \$1.50 to \$6.00 per day, European plan. Hotel first class. Secure rooms by writing to E. C. Dunnavant, St. Louis Service Co., Seventh and Olive Streets, St. Louis, Mo.

CHARLES A. MEEKER, D.D.S., Sec'y.

North Carolina State Board of Dental Examiners.

The regular annual meeting of the North Carolina State Board of Dental Examiners will be held in Morehead City, N. C., June 27, 28 and 29, 1904. Practical demonstrations will be required in both operative and prosthetic dentistry. Applicants must furnish instruments and materials. For further information address the Secretary.

R. H. JONES,

Winston-Salem, N. C.





New Jersey State Board of Registration and Examination in Dentistry.

The New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the theoretical branches in the assembly room of the State House at Trenton, N. J., on July 5, 6 and 7. Sessions begin promptly at 9 a. m.

The practical prosthetic and practical operative work will be done in Newark. All applications must be in the hands of the secretary ten days prior to the examination. For further information apply to the secretary.

CHARLES A. MEEKER, D.D.S.,
Fulton Street, Newark, N. J.

Massachusetts Board of Registration in Dentistry.

The next meeting of the Massachusetts Board of Registration in Dentistry for the examination of applicants will be held in Boston on June 22, 23 and 24, 1904.

Application blanks and all necessary information furnished by the Secretary.

G. E. MITCHELL, Sec'y.

25 Merrimack St., Haverhill, Mass.

Ohio State Board of Dental Examiners.

The Board of Dental Examiners of the State of Ohio will meet in Columbus, O., June 28th, 29th and 30th, at the Hotel Hartman, for examination of candidates for certificates of registration.

Application should be filed with the Secretary by June 18th. For further information address,

H. C. BROWN, Sec'y.

South Carolina State Board of Dental Examiners.

The South Carolina State Board of Dental Examiners will meet at White Stone Lithia Springs on July 15. All candidates for certificates will govern themselves accordingly.

Leesville, S. C.

E. J. ETHEREDGE, Sec'y.



Dental Commissioners of Connecticut.

The Dental Commissioners of the State of Connecticut hereby give notice that they will meet at Hartford on Thursday, Friday and Saturday, July 14, 15, 16, 1904, respectively, to examine applicants for license to practice dentistry, and for the transaction of any other proper business.

The practical examination in operative and prosthetic dentistry will be held Thursday, July 14, at 9 a. m., in Putnam Phalanx Armory, corner Haynes and Pearl Streets.

The written theoretic examination will be held Friday and Saturday, July 15 and 16, at the Capitol.

All applicants should apply to the Recorder for proper blanks and for the revised rules for conducting the examinations.

Application blanks must be carefully filled in and sworn to, and with fee, \$25, filed with the Recorder on or before July 7, 1904.

By direction of the Dental Commissioners

Wallingford, Conn.

J. TENNEY BARKER, Recorder.

N. B.—Examination fee must be forwarded by money order or certified check. Enclose stamp.

West Virginia State Board of Dental Examiners.

The West Virginia State Board of Dental Examiners will hold its spring meeting for examinations June 1, 2 and 3, at Wheeling, W. Va. For further information address the Secretary. Lock Box 402, Morgantown, W. Va.

H. M. VAN VOORHIS, Sec'y.

Montana State Board of Dental Examiners.

The annual meeting of the Montana State Board of Dental Examiners will be held in Helena June 6, 7, and 8, 1904. Application blanks may be obtained from the secretary. Applicants must furnish all materials for demonstration.

Helena, Mont.

D. J. WAIT, Sec'y.





Idaho State Board of Dental Examiners.

The next meeting of the Idaho State Board of Dental Examiners will be held in Boise, June 13, 14 and 15, 1904. Examination fee is \$25. Candidates will be examined in anatomy, physiology, chemistry, metallurgy, pathology, therapeutics, prosthetic dentistry, operative dentistry, dental materia medica, orthodontia, histology and oral surgery.

Mackay, Idaho.

W. W. PALING, Secretary.

Minnesota State Board of Dental Examiners.

The Minnesota State Board of Dental Examiners will meet for the purpose of examining applicants for license June 13th, 14th and 15th, 1904.

No applications received after 12 m. June 13th. Meeting held at dental department of State University at Minneapolis.

Wabasha, Minn.

C. H. ROBINSON, Sec'y.

New Hampshire Board of Registration in Dentistry.

The New Hampshire Board of Registration in Dentistry will hold their annual meeting June 14-15, 1904, at New City Hotel, Manchester, N. H., for the purpose of examining applicants for licenses. Applicants should come prepared with instruments and material to put in one gold and one alloy filling. So far as possible patients will be furnished. Session will begin promptly at 9 a. m.

A. J. SAWYER, Sec'y.

Manchester, N. H.

Colorado State Board of Dental Examiners.

The regular semi-annual meeting of the Colorado State Board of Dental Examiners will be held in Denver, June 7th, 8th and 9th, 1904.

The examination will be both theoretical and practical, and applicants for the examination must be prepared to do such work as is required. All applications must be filed before June 7th. For particulars address,

M. S. FRASER, Sec'y,
407 Mack Building, Denver, Colo.



South Dakota State Board of Dental Examiners.

The South Dakota State Board of Dental Examiners will hold its next regular session for the examination of applicants for license, at Aberdeen, S. Dak., June 9th, beginning at 1.30 p. m. All applicants will be required to insert at least two gold fillings, and such other work as the Board may require. Besides the regular operating instruments each candidate is required to bring a bridge of not less than four teeth, including one Richmond crown and one molar crown, invested ready for soldering. Application must be made to the secretary at least one week before examination takes place.

G. W. COLLINS, Sec'y.

Pennsylvania State Board of Dental Examiners.

The Board of Dental Examiners of Pennsylvania will conduct examinations simultaneously in Philadelphia and Pittsburg, June 8-11, 1904. Applicants for license must address the Hon. C. N. Schaeffer, Secretary of the Dental Council, Harrisburg, Pa., for papers or future information.

Vermont Board of Dental Examiners.

The Vermont Board of Dental Examiners will meet at Montpelier on Tuesday, July 5, 1904, at two o'clock p. m. for the examination of candidates to practice dentistry.

Headquarters at the Pavilion Hotel.

Application blanks, together with rules and instructions to candidates, can be had on application to the Secretary. Application, with the fee, \$10, must be filed on or before June 27, 1904.

St. Johnsbury, Vt.

Eastern Dental Society of the City of New York.

The twenty-seventh regular meeting of the Eastern Dental Society of the City of New York was held Thursday, April 7th, 1904, at their quarters, Clinton Hall. The attendance was unusually large,





ITEMS OF INTEREST

due to the fact that all the east side dentists were invited to attend the meeting. The speaker of the evening, R. Ottolengui, M.D.S., delivered a most instructive and interesting lecture on "Comparative Merits and Demerits of Gold and Plastic Fillings," lasting for over an hour and a half. After the lecture a free discussion followed, in which many practitioners participated. At the conclusion of the debate a vote of thanks was tendered to Dr. Ottolengui for his good will in helping the Eastern Dental Society to promote dental education among its members. The speaker and his two friends and colleagues, Dr. Charles A. Meeker, of Newark, N. J., and Dr. Charles F. Ash, of Brooklyn, N. Y., who accompanied him to the meeting, were then escorted to the cafe in the building, where a collation was served in their honor. The next regular monthly meeting will be held Thursday, May 5th, at Clinton Hall, 151-153 Clinton Street.

Dr. JOSEPH SÖCKNE, Sec'y.

Mercer Dental Society.

With this month the Mercer Dental Society, of Trenton, N. J., makes its debut.

Organization was perfected at a meeting held in the Council Chamber on the evening of May the 12th, 1904, and initial officers were elected as follows: President, Chas. H. Dilts; Vice-President, A. E. Boice; Secretary, F. K. Heazelton; Treasurer, John E. Woolverton.

Helpful and inspiring addresses were made by Dr. H. S. Sutphen, President, and Dr. Chas. A. Meeker, Secretary, of the State Dental Society, and appreciation of their attendance upon the natal occasion was expressed by honorary membership.

Seventeen signatures recorded the Charter Members. Meetings will be held quarterly, the next one on the 14th of July.

Visitors are welcome.

F. K. HEAZELTON, Secretary.

